a W. R. C. Smith publication

FIFTY CENTS

Textile Industries

Formerly "COTTON"

AUGUST 1960

MAN-MADE FIBERS—1960
exclusive feature articles on textured yarns today, making silk-like fabrics, dyeing with azoics, the polypropylene story. . . plus a handy fiber properties and use chart
pages 93 through 124

COTTON RESEARCH CLINIC
full text of papers on mill control of short fibers, effect of short fibers, a new trashmeter, automatic draft control at drawing
pages 125 through 143

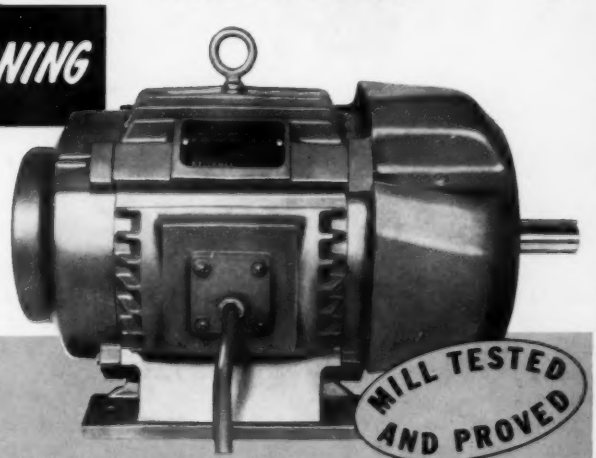
Knitting section
pages 159 - 165

NO MORE MOTOR CLEANING

The *new* Duty Master Lint-Proof Textile Motor is totally enclosed, positively eliminating lint-clogging. Lint-filled air cannot penetrate the sealed motor housing, and the high velocity cooling fan blasts lint off the outside of the motor.

It will pay you to try these new textile motors and see how they cut operating costs by eliminating motor cleaning.

Now available—1-40 hp. general purpose, textile motor for application on spinning, roving, drawing, and twisting frames . . . and on cards, openers, pickers, and other textile machines. B-1108-B



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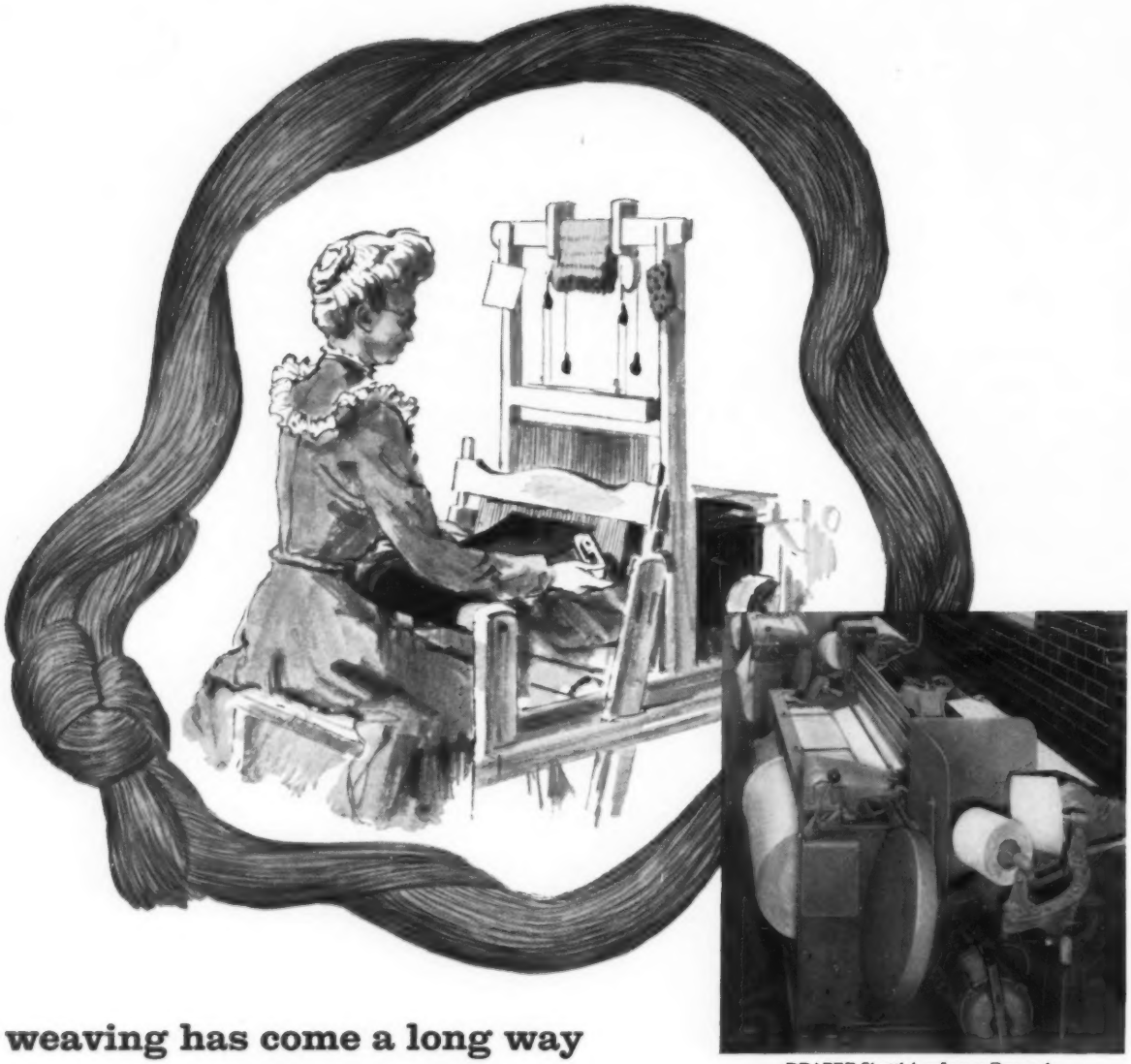
Next month—Special feature on wet processing



DRAPER Shuttleless Looms Powered by DIEHL Power Transmitters.

weaving has come a long way since grandma's day

The old way was a good way. Diligent, almost painful attention to detail, saw to it that each thread was expertly placed and woven. Yes, doing it the old way resulted in quality, almost break-free fabrics . . . but it was so laboriously slow.

The spectacularly new, compact, low silhouette shuttleless looms, recently introduced by Draper Corporation, Hopedale, Massachusetts, are shown on the line at Pepperell Lindale. Among the advantages claimed for the new design looms are . . . increased production . . . improved quality . . . economical operation, and lower cost of maintenance.

When DIEHL entered the field and pioneered the Power Transmitter for textile looms it soon became evident that Speed as well as Quality could be built into weaving. Today DIEHL Power Transmitters are used by more textile mills than any other type drive.

Over the years, trouble-free DIEHL Transmitters have taken the skill that was in grandma's fingers and have animated it with DIEHL job-engineered power. The result—products that embody the old "hand made" *spirit*, manufactured with the *speed* required by cost conscious, modern day mills.

*A Trademark of DIEHL MANUFACTURING COMPANY

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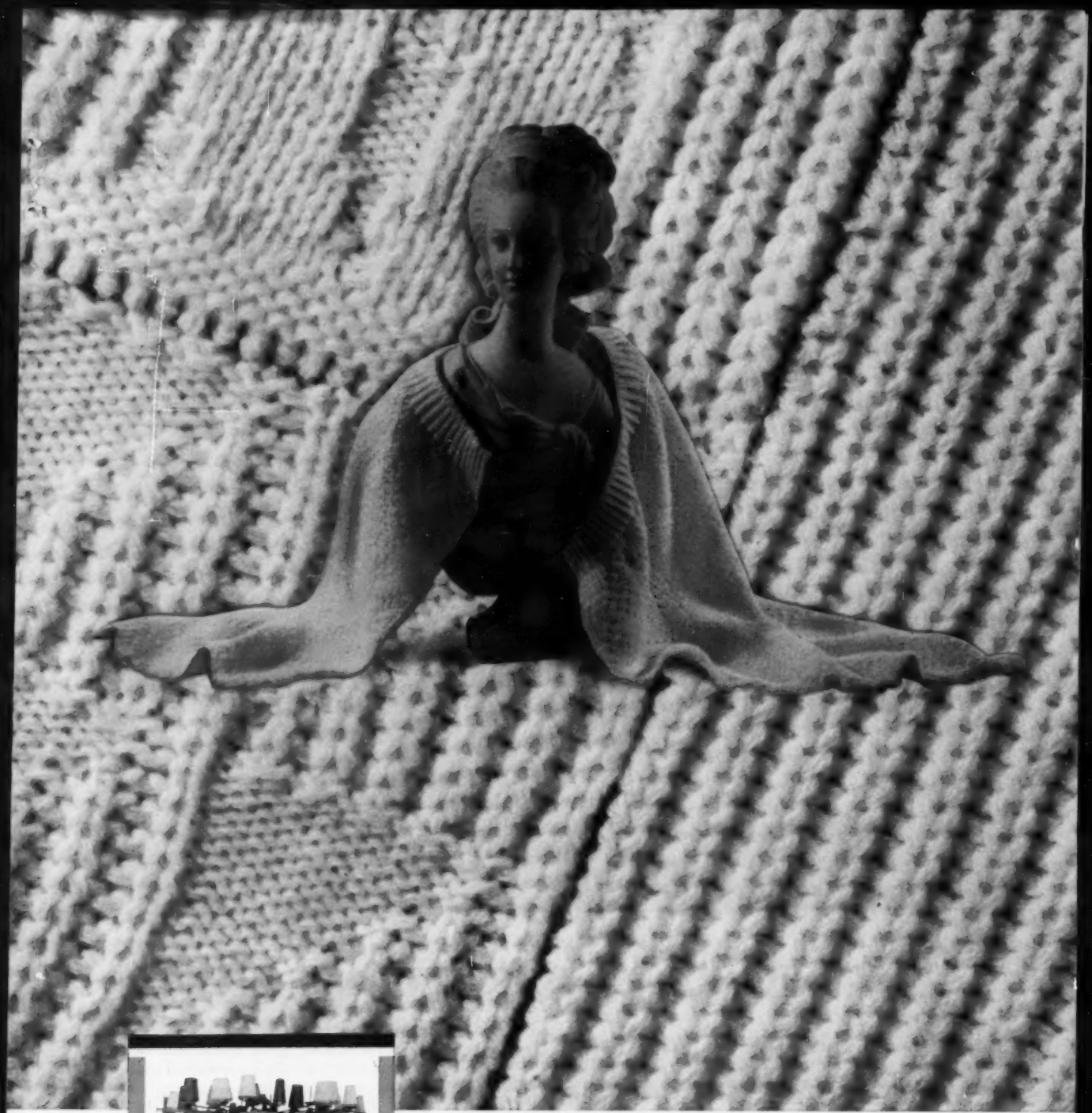

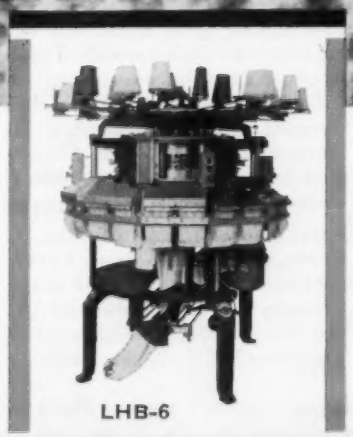

LHB-6

Traditional quality . . .

Now the LHB-6 offers quality "Bulky knits" in 3 or 4 cut 30" diameter with all the versatile features of the LH-6. A machine designed especially for "bulky knit" fabrics with a wide range of pattern possibilities including half cardigan, links and links, jersey, reverse jersey or in a variety of combinations with panels, self designs, tuck effects and other fancy stitches all with various rib cuffs.

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A subsidiary of Draper Corporation, Hopedale, Mass.

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Find out how you, too, can profit by changing to Enka nylon. Call Enka Merchandising at 350 Fifth Ave., New York 1, N. Y. PEnnsylvania 6-2300. Or, contact the Enka Sales office nearest you.

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Textile Industries

Formerly "COTTON"

AUGUST 1960 VOL. 124, NO. 8

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IN ACTION

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Constant research for better, economical paper carriers!

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Products for Textiles

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Southern Textile Exposition
Greenville, S. C.
October 3 - 7, 1960
Booth 244

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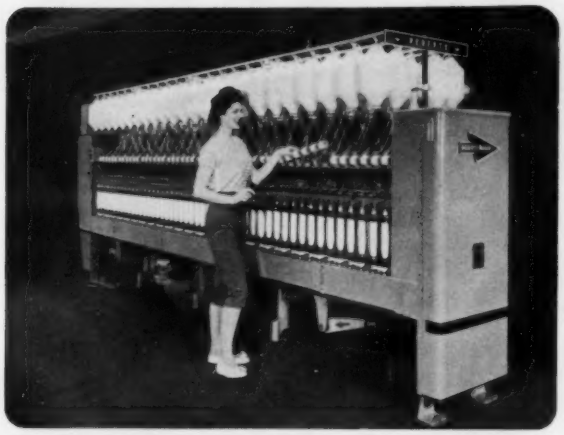
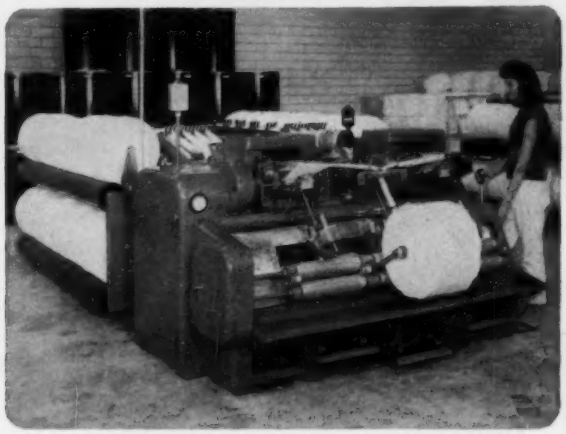
ROBERTS

YARN MAKING MACHINERY

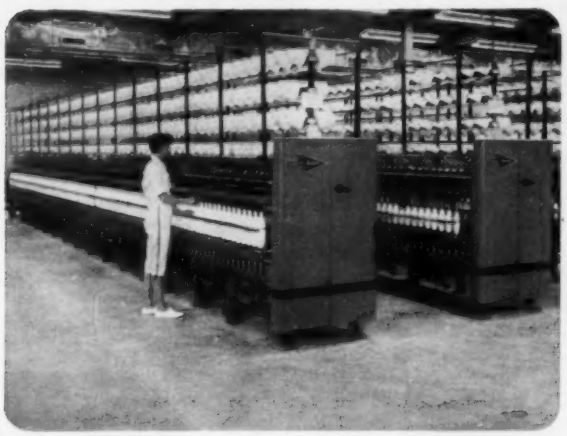
for Cotton, Worsted, or Long Fiber Systems



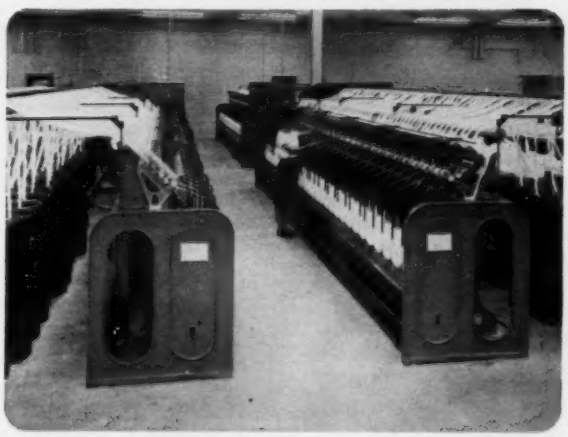
ROBERTS ARROW SPINNING for both cotton system and long fiber system yarn spinning for natural and synthetic fibers and blends. High speed, all ball bearing, big package Arrow Spinning Frames in 25-inch or 36-inch width. Exceptional flexibility and simplicity of operation in the manufacture of improved quality yarns at reduced costs and modest initial investment.



ROBERTS-TEMATEX worsted system preparatory machines, including ParaBlenders, ParaDrafters and AutoEveners, are rugged, high performance machines for pinning, parallelizing, drafting and blending worsted and synthetic fibers prior to roving and spinning, and in top making plants. AutoEvener automatically and instantaneously corrects delivered sliver weight to within plus or minus 1%.



ROBERTS TWISTERS for plying yarns are completely ball bearing equipped and designed for high speed ring twisting operations. 25- or 36-inch frames. Up to 3½-inch rings and 12-inch bobbins. Package weights 1¼ pounds on cotton, ¾ to 1 pound on worsted.



ROBERTS ROVING FRAMES are ball bearing rebuilt and feature all-new heavy duty ball bearing Roberts Double Apron Drafting Systems for cotton, short staple or long fiber synthetics, worsted and blends. 10x5 and 12x7 packages. Provisions for double headed spools.

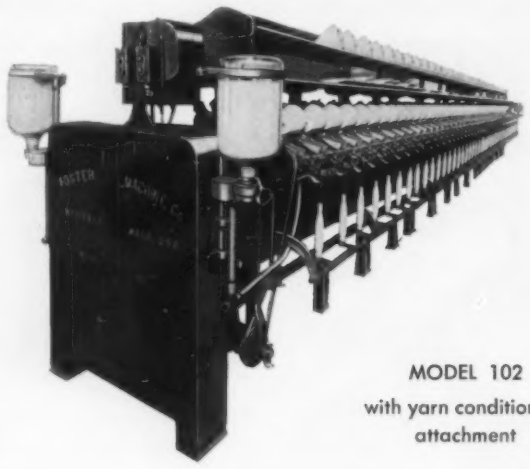
Simplicity of design, rugged construction and high speed ball bearing operation are the trade marks of all Roberts Company machinery. Roberts also supplies rebuilt spinning frames and modernization change-overs for mills' existing machinery.

ROBERTS COMPANY

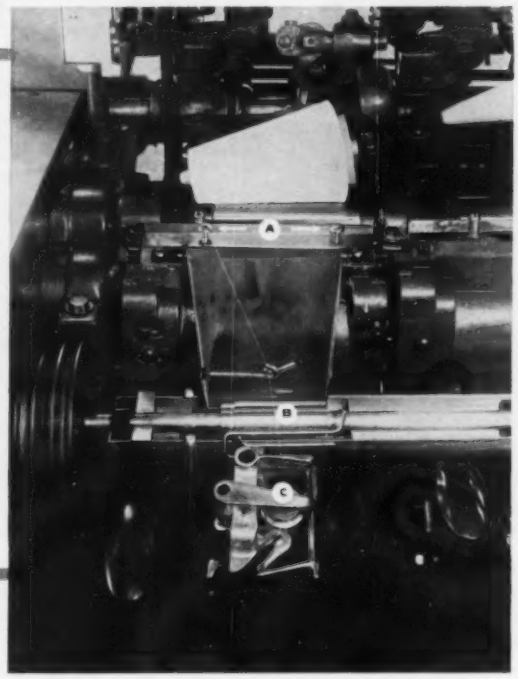
SANFORD, NORTH CAROLINA

FOSTER MODEL 102

. . . For Backwinding Bulk, Stretch and Texturized Yarns



MODEL 102
with yarn conditioning attachment

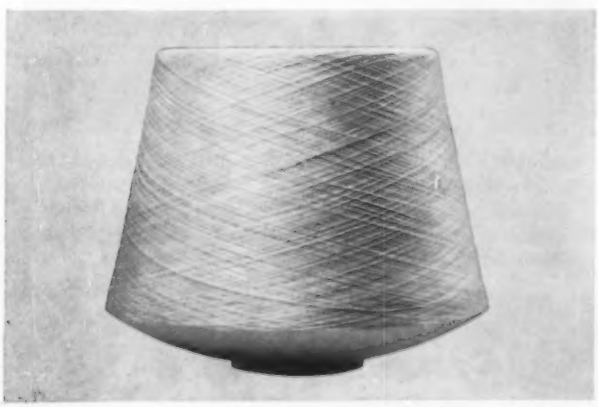


Mushroom buttons (A), moistening attachment (B) and tension attachment (C) on Model 102.

An Outstanding Example of This Machine's

FLEXIBILITY

For many years the Foster Model 102 has been widely accepted for the winding of all types and counts of spun yarns, because of its flexibility, or adaptability, including adjustable angle of wind and adjustable taper. Once again this reputation is confirmed by the machine's recent economical adaptation to the winding of bulk, stretch and texturized yarns.



142-9 Cone of Textralized® yarn wound on Model 102.

In addition to flexibility the Model 102 offers the following: —

QUALITY CONES. The increased taper reduces yarn drag and equalizes tension at all cone diameters. The convex base prevents "nipitis". Highly efficient slub catchers automatically inspect yarn. Ribbon breaker prevents ribbon wind. Idler shell on winding drum prevents chafing of yarn.

ECONOMY. Doubles production and reduces operating costs ⅓, as compared with obsolete machines, due to high speed, self threading tension device, easy donning and doffing and empty bobbin conveyor discharging into standard size truck. Repair costs as low as $10.00 per year per 100 spindles. Simple adjustments which any competent fixer can make.

Bulletin A-95-A on request

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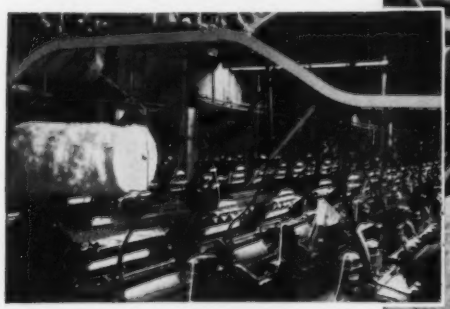
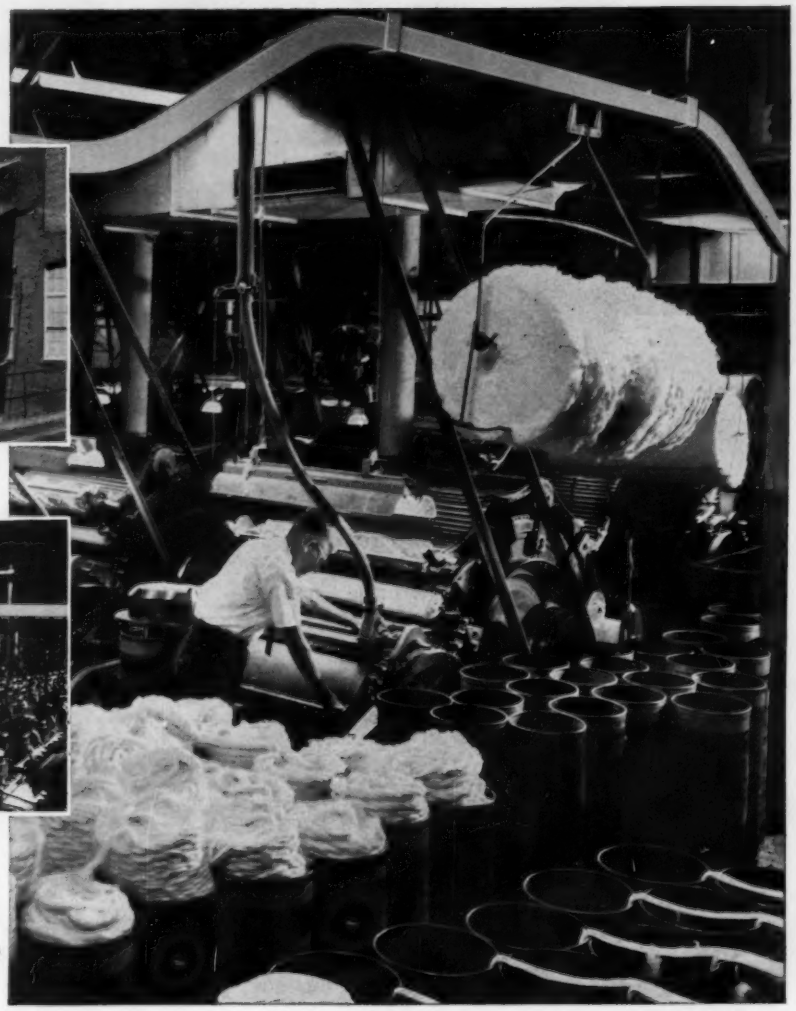
R-W "Zig-Zag"® CONTINUOUS POWERED CONVEYORS

. . . ideal for interplant

and intraplant



conveying in the textile industry.



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- **FLEXIBLE . . . easily move up, down, in, out and around . . . will carry unit loads up to 125 lbs. at speeds from one inch to 100 feet per minute. Easily installed in any plant.**
- **SAFE . . . all moving parts of the chain are fully enclosed and protected from dirt, lint and dust.**
- **STRONG . . . a continuous chain of alternate horizontal and vertical wheel units travel through a rugged steel track.**
- **EFFICIENT . . . designed, manufactured and backed by the leading firm in this field for over 75 years . . . Richards-Wilcox.**

R-W "Zig-Zag" Overhead Conveyors are extensively used in the textile industry to provide economical intraplant materials handling plus efficient interplant conveying. A "Zig-Zag" System unifies all mill operations for increased production with greater efficiency and lower production costs. The installation of a "Zig-Zag" System in the free overhead area permits complete utilization of the floor area for production purposes. In today's competitive textile market, the fast, efficient handling of materials is a *must* . . . you can best accomplish this with a system *tailored* to meet the requirements of the textile industry . . . R-W "Zig-Zag" Continuous Powered Conveyors. Request your copy of Catalog A-93R.

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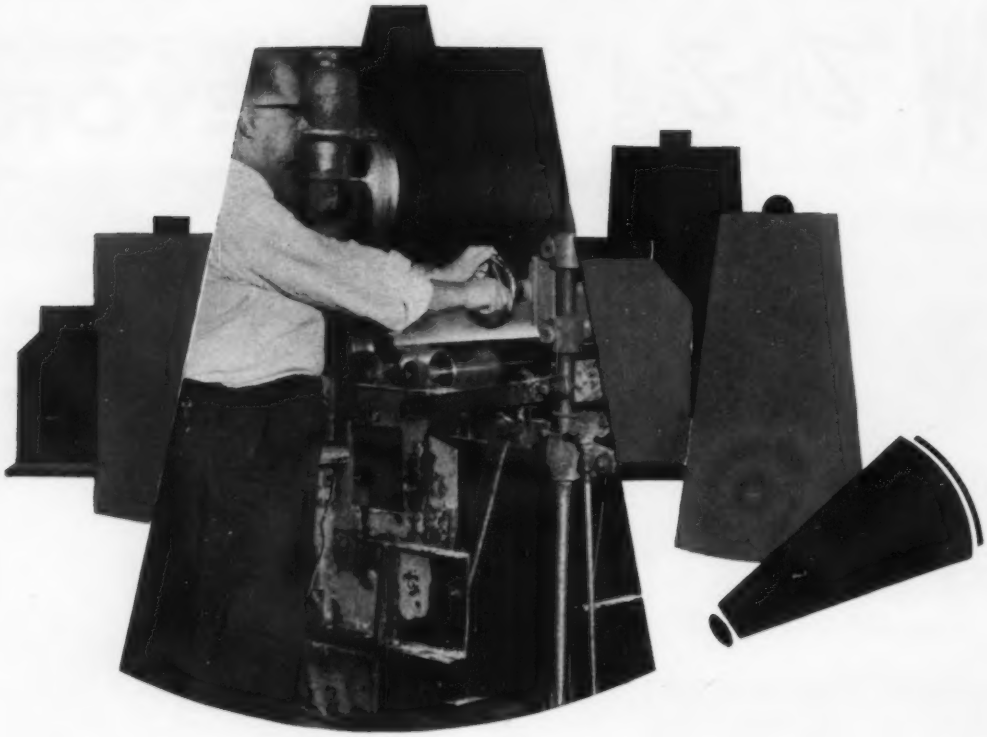
For further information use Handy Return Card, Page 193



CAUSTIC SERVICE PENNSALT STYLE

on-the-spot assistance . . . on-the-spot advice

Pennsalt Textile Mill Specialists are on-the-spot when you need them . . . ready to give you all the help they can on handling, storing, and applying caustic to kier boiling, scouring, bleaching, mercerizing, cellulose steeping and other textile processes.

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Pennsalt Chemicals
ESTABLISHED 1850

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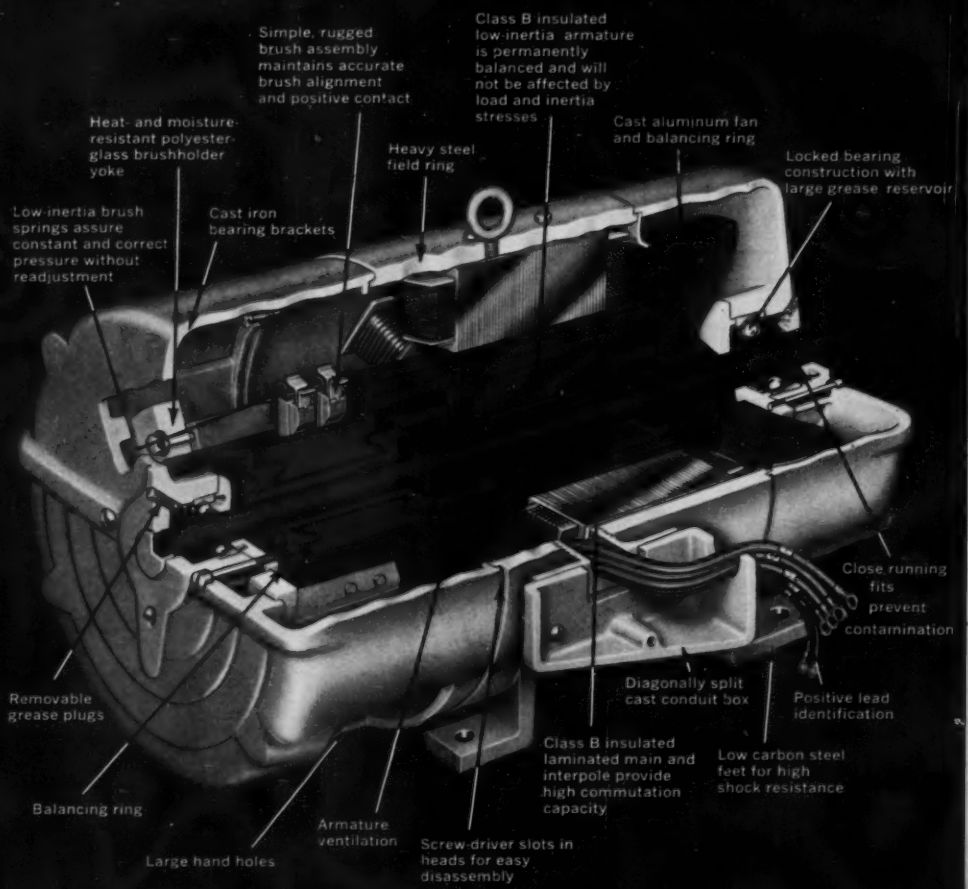
Simple, rugged brush assembly maintains accurate brush alignment and positive contact
Class B insulated low-inertia armature is permanently balanced and will not be affected by load and inertia stresses
Heat- and moisture-resistant polyester-glass brushholder yoke
Heavy steel field ring
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Low-inertia brush springs assure constant and correct pressure without readjustment
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Close running fits prevent contamination
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Positive lead identification
Class B insulated laminated main and interpole provide high commutation capacity
Low carbon steel feet for high shock resistance
Balancing ring
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Large hand holes
Screw-driver slots in heads for easy disassembly

...and some easy-to-add field modifications

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Helical single, double, and triple reduction gear units for all ratios

New Louis Allis FLEXITORQ® D-C MOTORS

...offer you vastly improved commutation–low brush wear–400% short-time overload capacity–and unmatched flexibility!

Bear this in mind: The Flexitorq is *not* just another *rerated* d-c motor. It's *all new*—and it's been designed to give you more for your power dollar — in superior performance, matchless field flexibility, and unrivalled economy of operation and upkeep.

Advanced armature design and brush construction offers improved commutation, faster response, and lower brush wear. Class B insulation system provides exceptional thermal endurance... is rated for 60°C rise for continuous duty... and creates a barrier to moisture, acids, alkalis, and other contamination.

The net result to you is reliable, trouble-free power for constant and adjustable speed drives. For example, Flexitorq gives you 400% faster acceleration, plus much better deceleration, reversing, and speed changing. You can safely impose 400% intermittent and 15% continuous overloads — and the high-torque design is a welcome plus when you need extra power for hard-to-start machines.

The new Louis Allis Flexitorq is lighter and more compact than previous d-c motors... lets you squeeze more power into less space... yet is actually *easier* to service! Brushes and entire brush-holder assemblies can be quickly inspected and removed without major disassembly. And since brush springs remain conveniently attached to the brush holders, brush changing is a simple affair.

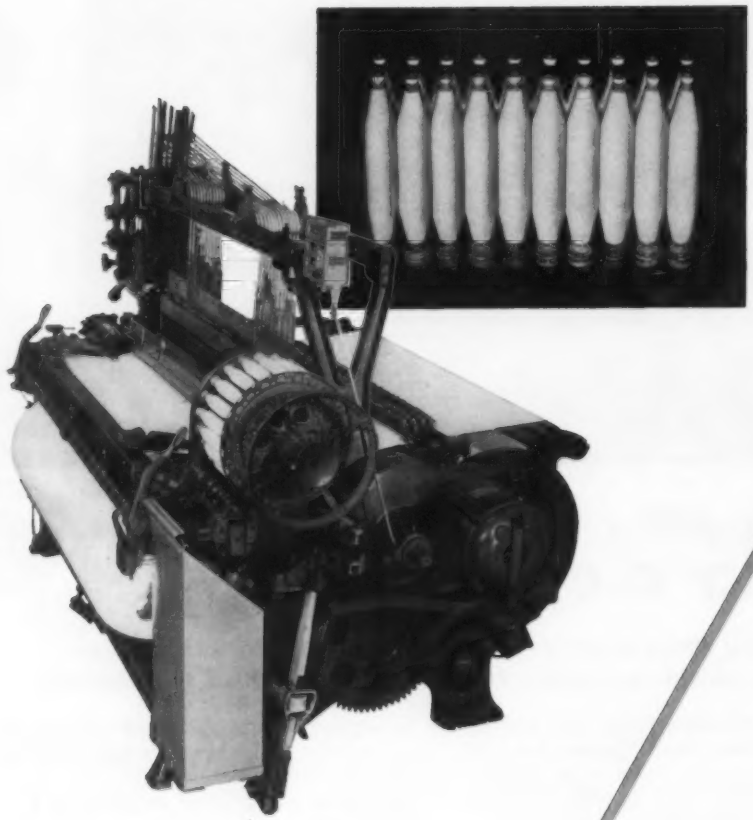
Flexitorq d-c motors are available in sizes from 1 to 400 hp — in various enclosures. See your nearby Louis Allis District Office for information and application help. Or write for Bulletins 3150 and 3200 to The Louis Allis Co., 468 E. Stewart St., Milwaukee 1, Wis.

LOUIS ALLIS

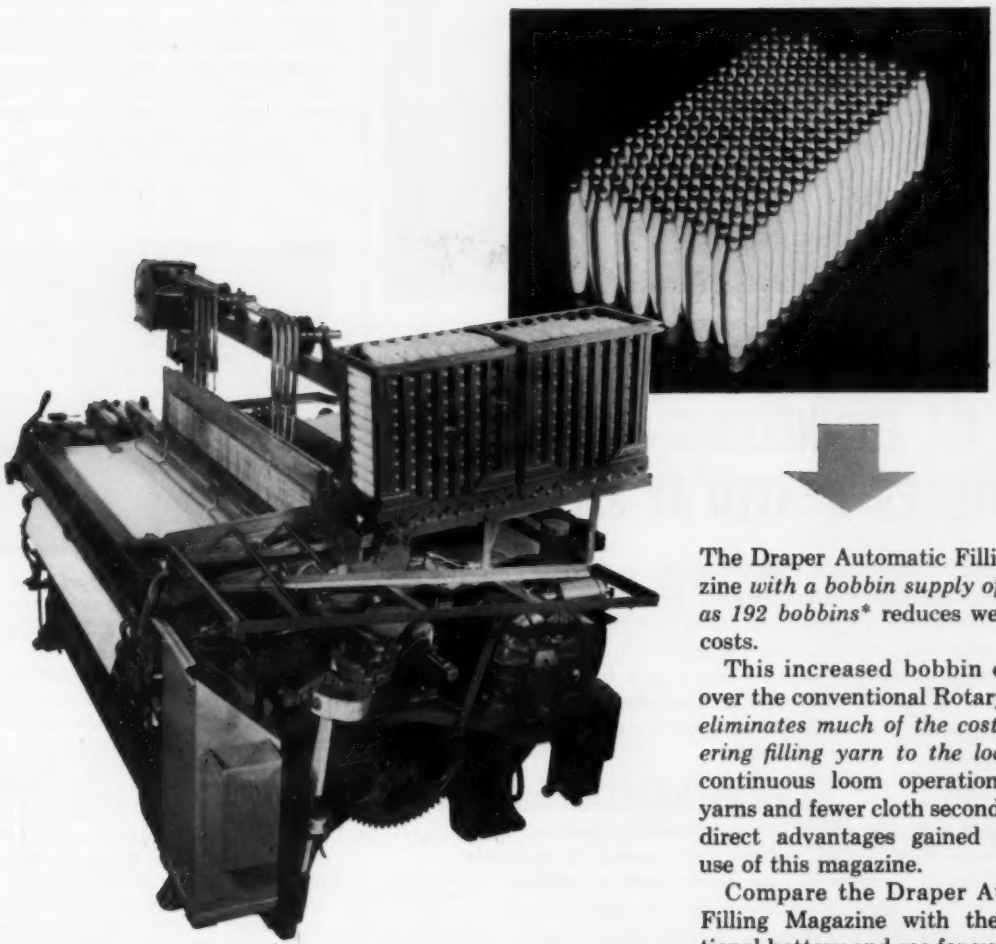
50-317

MANUFACTURER OF ELECTRIC MOTORS AND ADJUSTABLE SPEED DRIVES

REDUCE FILLING HANDLING...



TO A MINIMUM



The Draper Automatic Filling Magazine *with a bobbin supply of as many as 192 bobbins** reduces weave room costs.

This increased bobbin capacity, over the conventional Rotary Battery *eliminates much of the cost of delivering filling yarn to the loom.* More continuous loom operation, cleaner yarns and fewer cloth seconds are also direct advantages gained from the use of this magazine.

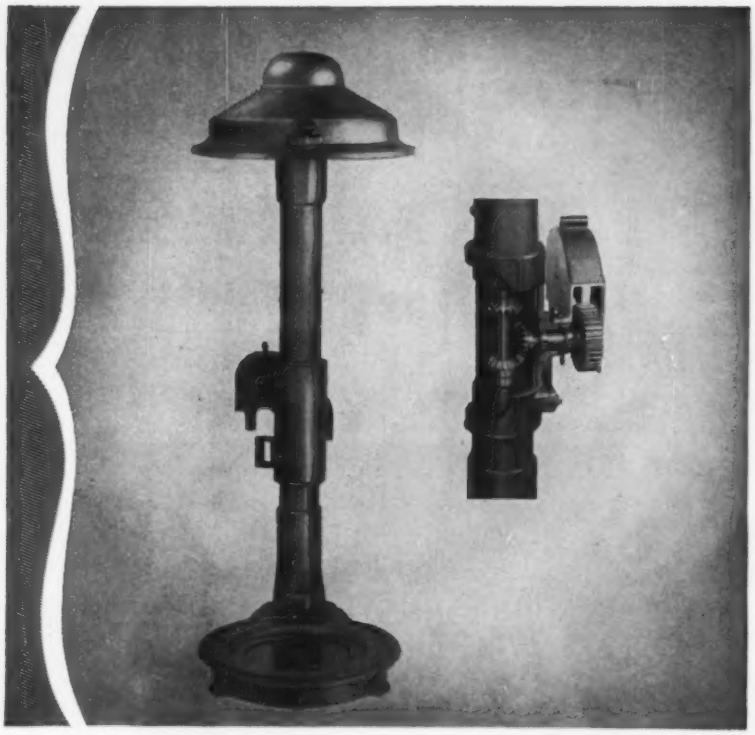
Compare the Draper Automatic Filling Magazine with the conventional battery and see for yourself the many benefits that can be obtained.

For additional information consult your Draper representative.

**1¼" diameter bobbins*

DRAPER CORPORATION

HOPEDALE, MASS. • ATLANTA, GA. • GREENSBORO, N.C. • SPARTANBURG, S.C.



SOUTHERN STATES' NEW COILER LINE HAS ALL ENGINEERING AND DESIGN FEATURES WANTED BY MILL MEN

To provide mills with a premium-quality coiler, every engineering and design feature wanted by mill men has been included on the new Southern States Coilers.

A new center adapter (see cutaway view above) permits the stand, head, and base to swivel as a unit within the adapter collar. The coiler may thus be offset for can diameters up to 20 inches and still maintain a straight gear drive take-off for coilers of all makes.

Southern States Coilers are designed for direct attachment to any make of card, left or right hand. Installation is rapid and economical. Other outstanding features of the Southern States Coiler include: ball bearing throughout—head, shaft, cantable ... cut tooth gears throughout ... tubular steel stand ... precision-ground calender rolls ... self-aligning pillow blocks on upright and calender roll shafts ... fully adjustable can table ... quickly detached coil spring roll-loading device ... and many others fully described in our Technical Bulletin 205, available from your Southern States representative or by mail direct from us.

SS **SOUTHERN STATES**
EQUIPMENT CORP.
HAMPTON, GEORGIA

SHORTS & REMNANTS

TI Alumni News

This was quite an active month for former editors of TI. First we received word of the retirement of **Jesse W. Stribling** as sales manager of Leesona Corp. Jess was on loan to TEXTILE INDUSTRIES (then called COTTON) for two years during World War II when Leesona (and *they* were called Universal Winding Co. then) didn't have anything to sell. Jess was editor of TI until **John Fonville** returned from foreign service.

Here's **Robert Leeson** (left), Leesona's president, saying farewell to Jess on the eve of his retirement:

Since his retirement, Jess has returned to Atlanta, where his friends may address him at 2657 Dellwood Dr., N.W., Atlanta 5, Ga.

Next came word of the retirement of **Robert W. Philip** as vice-president of Callaway Mills Co. Bob served for 25 years as associate editor and editor of TEXTILE INDUSTRIES, and vice-president of W. R. C. Smith Publishing Co., until he left at the beginning of 1944 to become president of Callaway Institute, Inc. When the personnel and facilities of the Institute became the Research Division of Callaway Mills in 1947, Bob was named vice-president and director of research. Then in 1959 he was named staff assistant to the chairman of the board. Bob served for 29 years as secretary of the Textile Operating Executives of Georgia, and is credited with developing and making the organization what it is today.

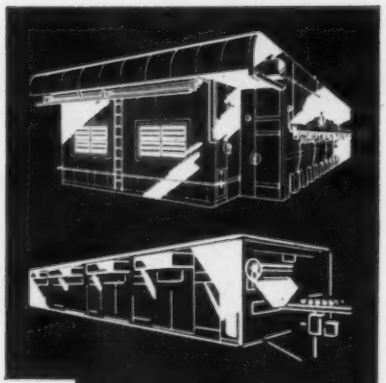
Here is a photo of Bob taken at his desk as editor of TEXTILE INDUSTRIES in December, 1941. For a pic-

Continued on page 20

Two Reasons Why the Textile Industry Looks FIRST to "NATIONAL"...

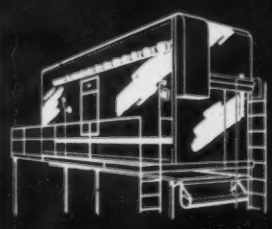
Leadership IN DRYING TECHNOLOGY PROGRESS

During the past forty years, "NATIONAL" research and design engineering have given to the Textile Industry consistently new concepts of drying procedures and equipment. Speed, efficiency and quality in the drying of textiles in all forms—from fibre to finished goods—have been revolutionized due in large measure to the patented features of "NATIONAL" design and construction.

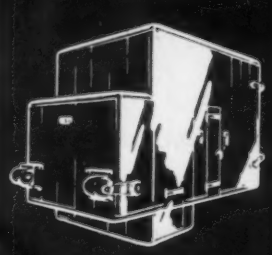


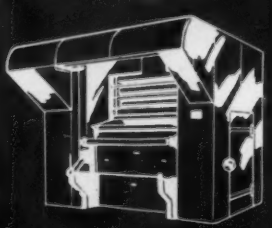
One Source FOR ALL TYPES OF DRYING EQUIPMENT

The list of "NATIONAL" dryers and conditioning units covers the full range of the Textile Industry's requirements—Loop, Print Goods, Tenter, Roll, Carpet, Skein, Yarn, Rayon Cake, Package Yarn, Stock and Swatch Dryers; Nylon Heat Setting Machines.



Case histories of installations in the categories listed above, showing the improved quality and production which invariably results from the use of "National" drying equipment, will be gladly furnished on request.

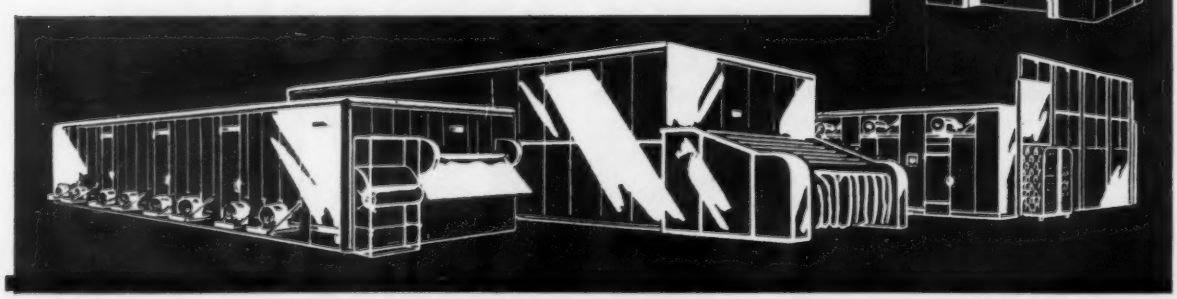




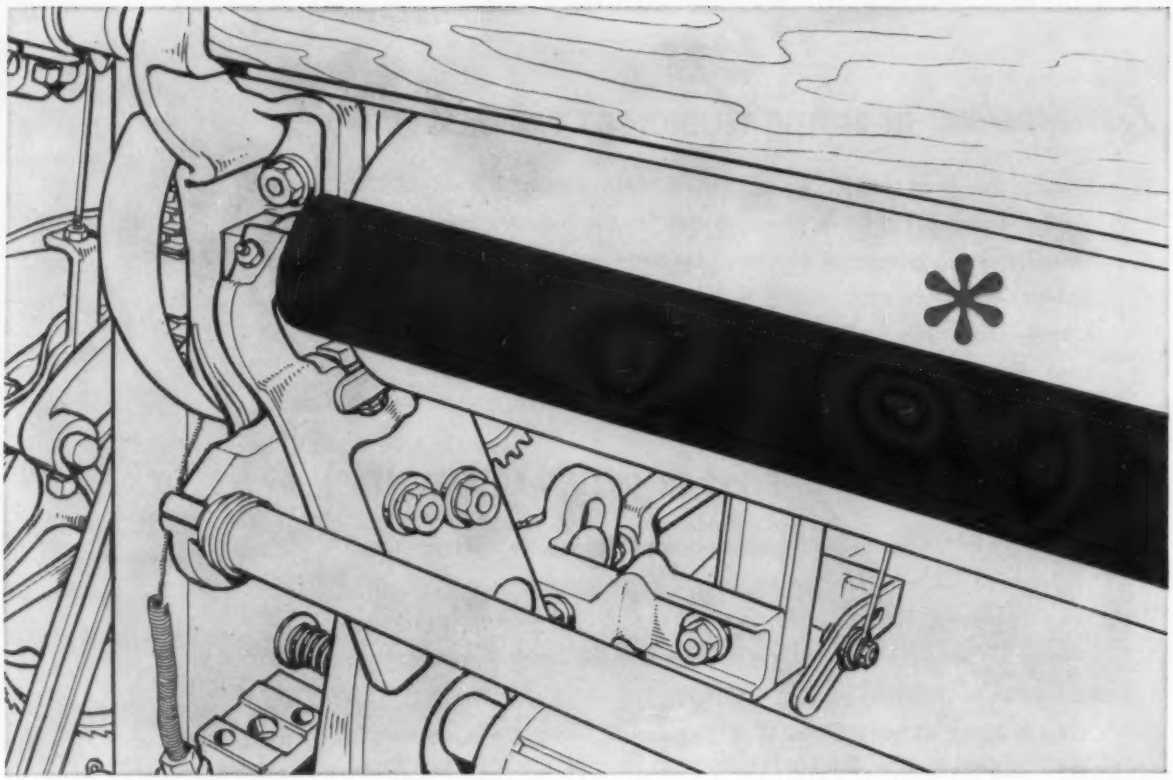
THE NATIONAL DRYING MACHINERY COMPANY

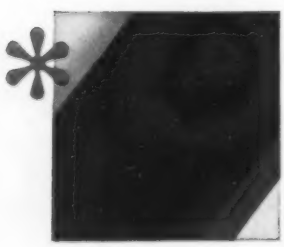
LEHIGH AVE. and HANCOCK ST., PHILADELPHIA 33, PA.

New England Agent: JONES & HUNT, INC., Gloucester, Mass. • *Southern Agent:* HAYES TEXTILES, INC., Spartanburg, S.C.
Cable Address: "NADRYMA"—W. U. Code



Cork-and-rubber press roll covering reduces fabric creasing on looms





You can practically eliminate the most common cause of fabric creasing—uneven maintenance of take-up roll tension—by switching to this new cork-and-sponged-rubber press roll covering. It's Armstrong Accotex DK-149.

This resilient material has a high friction surface. It holds the fabric snugly against the full width of the take-up roll, maintaining tension selvage to selvage. Despite this firm grip, DK-149 won't mark even the finest fabrics.

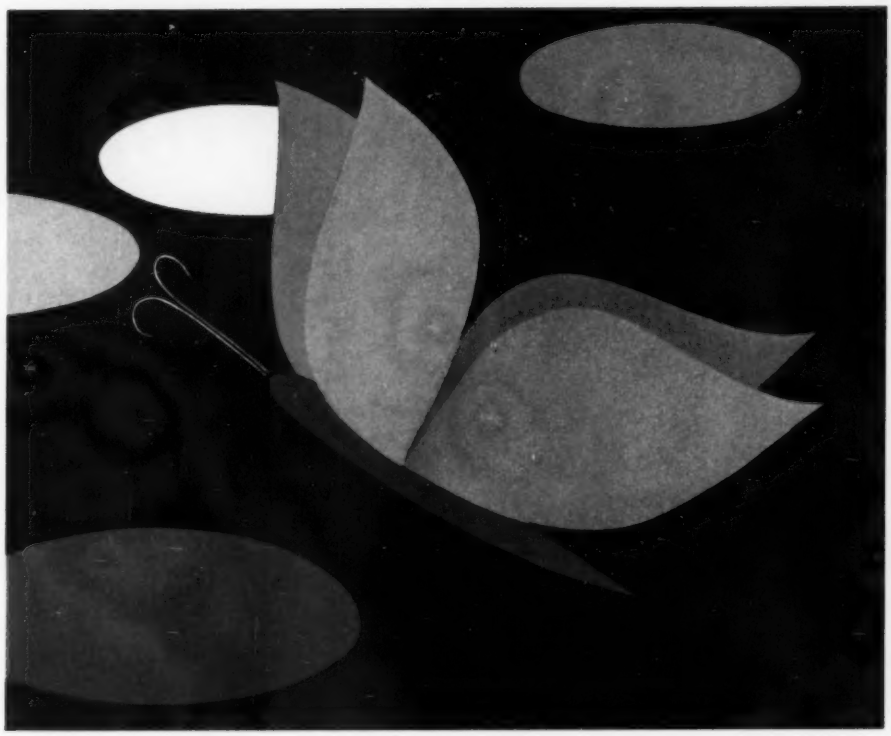
DK-149 can't pack down or develop high spots. It won't let the cloth slip or run unevenly and thus allow creases to develop. On many looms, DK-149 has run without replacement for more than three years.

Try this unique press roll covering on several of your looms. It comes in handy ribbon form for quick, easy application to press rolls. Your Armstrong man will help you arrange the test. Armstrong Cork Company, 6908 Ivy Street, Lancaster, Pennsylvania.

Armstrong LOOM SUPPLIES

1860-1960 Beginning our second century of progress

PUTNAM PRODUCTS FOR THE TEXTILE INDUSTRY



2042

Palanil® Dyestuffs

A complete range for dyeing and printing of polyester fiber material and blends with wool and cotton, satisfying all demands for fastness properties.

PALANIL Dyestuffs can be dyed with a carrier* at normal temperatures, or by all high temperature methods.

Palanil Carrier TX 5064 is a completely new type of carrier water soluble, non volatile, no odor, no effect on light fastness, no swelling of fiber, easy to apply.

BASF knows how

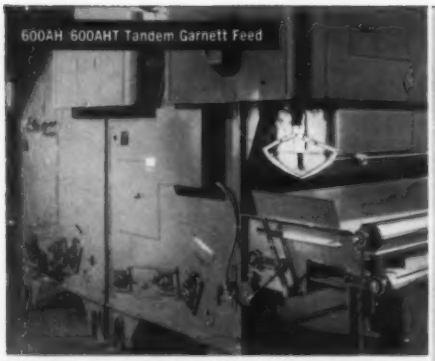
In Canada contact:
Consolidated Dyestuffs & Chemicals Ltd.
395 Beaumont Avenue
Montreal 15, Quebec

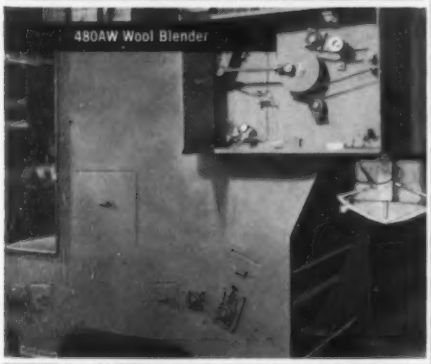
Samples and technical information available from:

PUTNAM CHEMICAL CORPORATION
BEACON, N.Y. • CHARLOTTE, N.C.

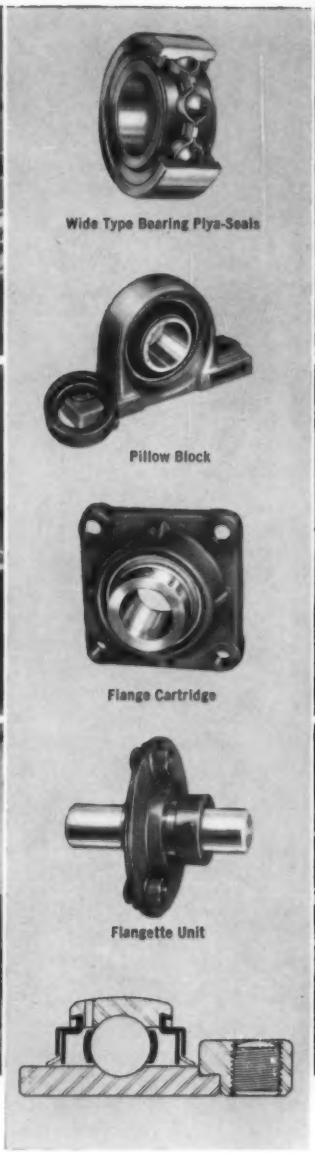
DISTRIBUTORS IN U.S.A. FOR *Badische Anilin- & Soda-Fabrik A.G.*
LUDWIGSHAFEN A. RHEIN, WEST GERMANY

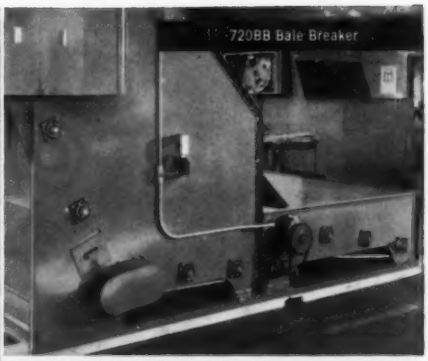
WAREHOUSES: Providence, R. I. • Paterson, N. J. • Philadelphia, Pa. • Greensboro, N. C. • Charlotte, N. C. • Greenville, S. C. • Chicago, Ill. • Los Angeles, Calif.





Fafnir Plya-Seal Ball Bearings and Ball Bearing Units are used extensively in the machines shown here made by James Hunter, Inc. of Mauldin, S. C., makers of Hunter Fiber Meter Automatic Blending Systems.





In Fafnir Plya-Seal Ball Bearings, tough, rubber-impregnated fabric seals ride in constant, firm contact with ground inner rings . . . provide "best protection yet" against contaminants, loss of lubricant.

Upkeep comes easy with Hunter machines equipped with Fafnir Plya-Seal Ball Bearings!

Lint is at its worst in bale breaking and fiber blending. Yet Fafnir Plya-Seal Ball Bearings "run clean" in Hunter machines. Contaminants can't get in; grease can't get out. Many Fafnir ball bearing units used by Hunter need no attention at all. They are factory prelubricated and permanently sealed.

Bearing installation comes easy, too. Self-aligning wide inner ring bearings in Fafnir power transmission units make for less critical shaft mounting. And a simple quarter turn of Fafnir-originated self-locking collars secures bearings to shafts with positive binding action. No shaft shoulders, adapters, lock nuts or other mounting accessories needed.

For nearly 40 years, textile equipment makers have turned to Fafnir for help with bearings. Put this experience to work for you! Write for full information. The Fafnir Bearing Company, New Britain, Connecticut.

FAFNIR
BALL BEARINGS

Only Emulsifiable AC® Polyethylene can create "Wash-and-Wear" finishes that... ★ Keep whites white ★ Do not retain chlorine ★ Resist scorching ★ Improve crease resistance

Now—and for the first time—*permanent* finishes for wash-and-wears are available that keep whites *white*, are nonchlorine-retentive, resist scorching at elevated temperatures, and add a new measure of crease resistance.

Already widely accepted by the textile industry, the new emulsions containing A-C Polyethylene benefit every type of synthetic and natural fiber in some way over other finishes. A-C Polyethylene improves "hand"—and in many cases the tear strength of the A-C Polyethylene-finished material is superior to the untreated fabrics.

In addition to better "hand" and tear strength, A-C Polyethylene-formulated finishes improve crease and abrasion resistance and improve sewability; lightfastness or dye shades are not affected.

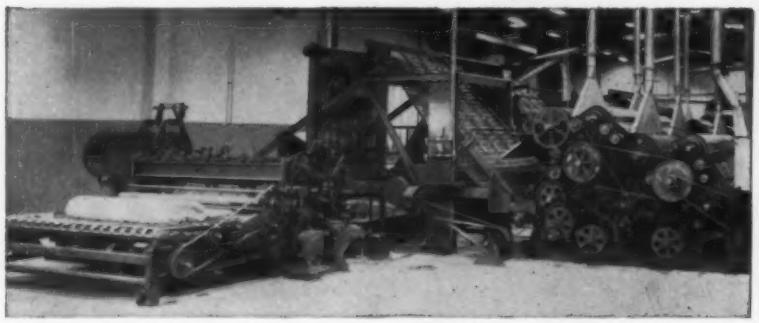
Write today for more information. Why not find out right now about this new advance in textile finishing? Your textile chemical supplier either has an A-C Polyethylene finish on hand or can formulate one for your specific needs. (We are manufacturers of resins, not finishing emulsions.) Or write to us direct for complete information.

Allied Chemical

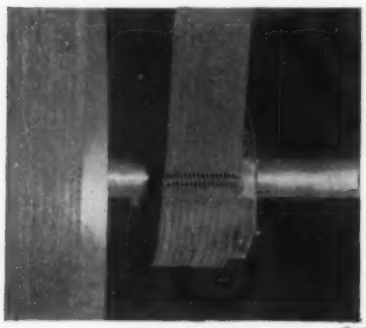
SEMET-SOLVAY PETROCHEMICAL DIVISION
Dept. 575-AN, 40 Rector Street
New York 6, N. Y.
National Distribution Warehousing in Principal Cities

"ENDLESS APRONS ARE HARD TO INSTALL"

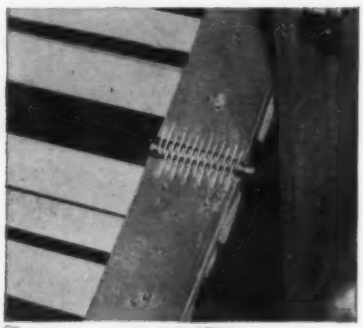
says E. M. HYDE, Project Engineer at Proctor & Schwartz, Inc.



A complete batt making line used in the manufacture of cotton batt for top quality mattresses. The unit is designed and built by Proctor & Schwartz of Philadelphia, Pa.



Close-up of Clipper lacing used on drive belt of feed in batt making line



Close-up of Clipper lacing used on a traveling apron in the line

CLIPPER Joints ease installation problem, are as flexible and durable as the belt itself

Feed belts and drive belts are easy to install when Clipper laced. Joints as smooth and durable as the belt itself are easily made by one man using Clipper method. Clipper lacers develop up to 45,000 pounds of pressure to imbed specially designed Clipper steel wire hooks flush with the belt. The strain is evenly distributed across the width of the belt so that the joint is smooth and durable. It operates well on both small and large diameter rollers.

When you have two ends to join, chances are you can join them easier with Clipper hooks and lacers. Any type of belting material in various widths and up to 13/32 inch thick can be laced faster and better by Clipper.

For more information — Detailed product information and case history examples of Clipper machine lacing benefits are contained in Bulletin No. 157. Send for your free copy today.

Ask your Industrial Distributor for Clipper Products

Clipper BELT LACER COMPANY

980 Front Ave., N. W., Grand Rapids 2, Michigan

(from page 14)

ture of Bob as he looks today, see page 32.

Then came news of an honor bestowed on our former associate editor, **Hunter Hughes,** who was elected the first and only honorary member of the Berlin Section of the Association of Consulting Engineers of Germany (Verein Beratender Ingenieure e. V. Berlin). After serving as assistant editor of our sister magazine, *Southern Power & Industry,* Hunter was TI's editorial representative in the Carolinas from 1948 to 1952, when he left to become editor of *Consulting Engineer,* of St. Joseph, Mich.

Here's Hunter (right) receiving his

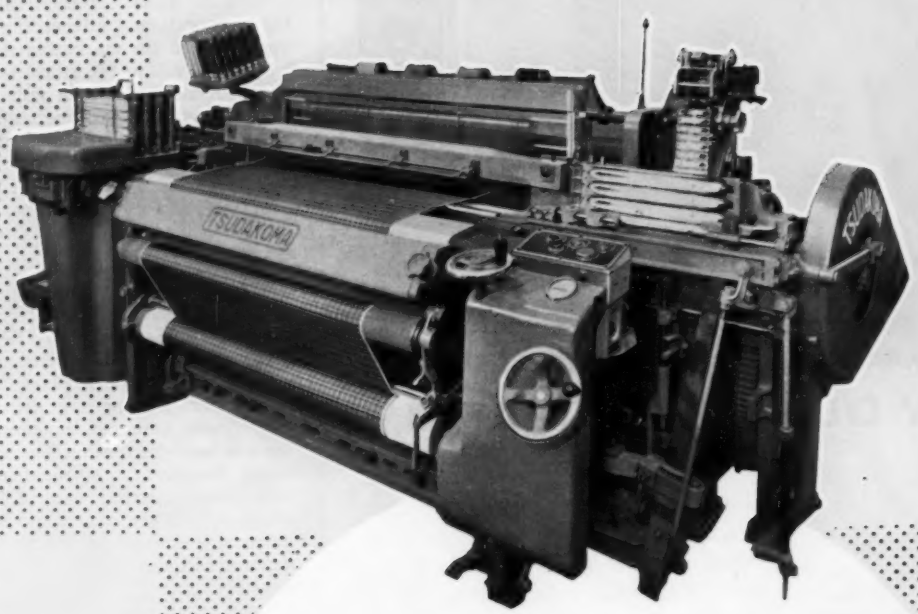
scroll from **H. E. Berenz,** German consul in Chicago.

And finally came some sad news, of the death at the age of 82 of **Mrs. Lula Meade West,** who for many years was editorial assistant to Bob Philip, Jess Stribling, and John Fonville.

Another Metal Detector

"You may be interested for your column on Recent Technical and Commercial Developments in the fact that we at American have developed and applied for a patent on a contact-type metal detector for fabrics. We have one of these in use in our

Tsudakoma



ツダコマ

Automatic Loom and Ordinary Loom

Dobby

Preparatory Machine

Throwing Machine
High Speed Bobbin Winder
Doubling Machine
High Speed Bottle Winder
High Speed Warping Slasher
High Speed Sectional Warper
High Speed Magazine Creel

TSUDAKOMA INDUSTRIAL CO., LTD.

Head Office : Kanazawa, Japan
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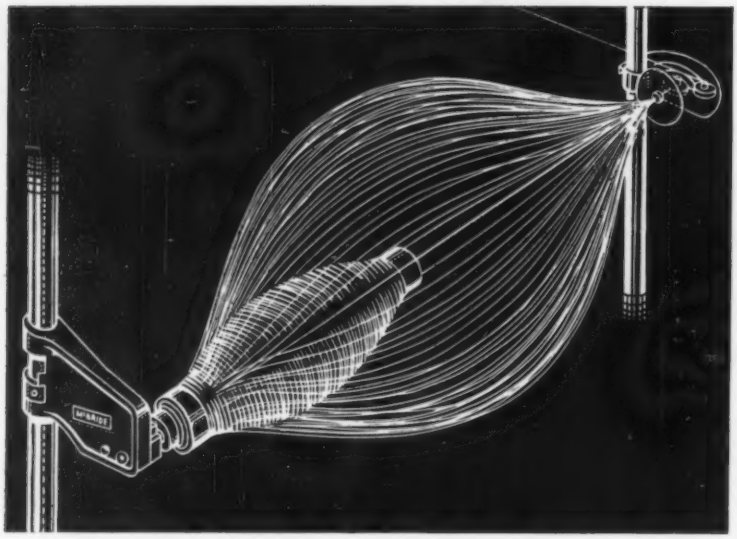
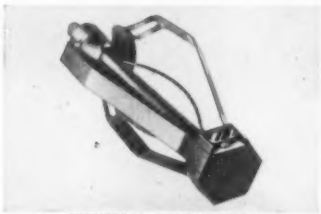
For further information use Handy Return Card, Page 193

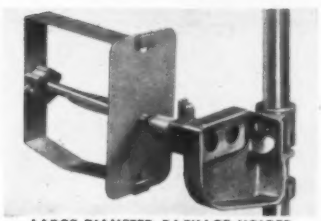
BE ON TARGET WITH McBRIDE



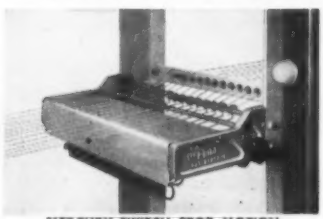
HEAVY DUTY CREEL ARMS



UNIVERSAL CONE HOLDER



LARGE DIAMETER PACKAGE HOLDER



MERCURY SWITCH STOP MOTION

Are your creel arms overloaded? Have you a problem reaching the target (entrance eye) on your tensions? If so you are losing warping efficiency. McBride's heavy duty package arm is designed specifically to correct this situation!

No Sag — even the largest packages stay straight on target for accurate over end draw off.

Fast Change — arm swings back out of way for package change, no interference with ballooning yarn.

McBride swing arm assemblies are made to fit all packages.

Instant changeover with McBride Quik change cone and large diameter package holders.

Complete new creels or fittings to modernize your existing creels.

Write today for our latest catalog.

LET McBRIDE STUDY YOUR WARPING SITUATION. YOU MIGHT BE SURPRISED WITH THE COSTS YOU CAN SAVE, THE IMPROVED QUALITY IN THE WARPS YOU PRODUCE.

CREELS *FOR EVERY PURPOSE*, CONE HOLDERS, STOP MOTIONS, TENSION CONTROLS, WARP BEAMS, FLANGES, CARPET INSPECTION TABLES, METAL AND WOOD ROLLS.

Complete engineering service is part of every McBride installation.

McBRIDE

COTTMAN AVE. & WISSINOMING ST.
PHILADELPHIA 35, PENNSYLVANIA
In Canada: Hugh Williams & Co., 27 Wellington St. E. Toronto 1, Ontario

SHORTS & REMNANTS

(from page 20)

own operation here installed in the head of a Gessner steam press where it has been very effective in removing such objects as broken heddles, doupes, feeler wires, and even ticket staples which cause damage and costly repairs to the press, if the power supply is not cut off in time.

"One of these has been sold to a southern mill and advertising is being prepared for marketing the unit, which will sell in the $1,300 to $1,500 range. A feature of the unit is that it can be set to pass metallic yarns and to stop if contact is made with a heavier metal object."

STANLEY B. HUSS
Asst. to Pres.
American Twine & Fabric Corp.
Salmon Falls, N. H.

Needs Information

We have been asked by **Ed Shaw** of Cherokee Textile Mills, Sevierville, Tenn., to help him find a source for Walker textile tape, a paper tape gummed on both sides for use on loom beams. He has also heard that a firm is repairing section beam barrels with Fiberglas and butyl rubber, and would like the name and address of this firm. Can anyone help on either of these requests?

Copies for Foremen

"The June issue of TEXTILE INDUSTRIES carries two articles that we would like each of our foremen to have. Will you please send us ten copies of each of the following: 'Tips for Employee Training,' and 'Ingenuity—A Key to Profitable Braiding.'"

S. B. KITCHING
West Georgia Mills, Inc.
Whitesburg, Ga.

Others requesting reprints from the June issue included **Katherine Glass,** Callaway Mills Co., LaGrange, Ga.; **Merle P. Finley,** pers. mgr., Guilford Woolen Mills, Inc., Guilford, Me.; and **Cecil B. Ray,** asst. mgr., fin. div., Pepperell Mfg. Co., Opelika, Ala. And **W. F. Davis,** pres., Palmetto Worsted Mills, Laurens, S. C., wanted to know how to get in touch with the Rosensteins mentioned in the article "Spunize Textured Yarn." They can be reached at Spunize Co. of America, Inc., Unionville, Conn.

New Use for Nylons

We ran across this recently in some tips for gardeners: "Store plant bulbs in old nylons. Hang from basement ceiling or any place where it is

Picker Overhauling Is Simple When You Depend On . . .

Aldrich Repair Service

We furnish skilled men for reworking pickers, and can deliver to these men any needed parts within 24 hours in most southern states, and within 48 hours to almost any cotton mill in the United States. This makes thorough overhauling a simple matter. Anything needed for a good job can be had at once, while the machine is down for repairs.

If you do your own overhauling, this speedy delivery service is just as valuable. You don't have to wait for repair parts — they are there when you want them.

We manufacture and install complete blending, opening, and picking systems for cotton and synthetics, and cleaning systems for cotton.

AldricH MachinE WorkS

Greenwood, South Carolina

(from page 22)

dry. All of one kind of bulb can be kept together and labeled. They can breathe freely and will be kept in good condition."

Wool Queen

And here we have **Patti Jo Shaw** being crowned as Miss Wool of America by her predecessor, **Carrell Currie:**

Miss Shaw is from Deer Lodge, Mont., and is a journalism major at the University of Montana. She's now on a tour of the nation displaying a $15,000 American wool wardrobe.

More on Tex

"We are interested in the new tex yarn numbering system and wonder if you could send us a copy of the article . . . 'Tex, A Universal Yarn Numbering System,' TEXTILE INDUSTRIES for April, 1958."

CHARLES E. DORKEY, JR.
Frankoweave, Inc.
Philadelphia, Pa.

David A. Macfarlane, managing dir., Canada Hair Cloth Ltd., St. Catharines, Ont., also wanted a copy of this article. TI has a chart for converting various yarn counts to tex, copies of which are available without charge to readers.

General Interest

"I would appreciate . . . anything that you might have on textiles in general."

ADDIE M. PRIDGEN
Durham, N. C.

● TI is available on microfilm from University Microfilms, Ann Arbor, Mich.

Move Over, Brother

"This world does not have an unlimited amount of space for an unlimited amount of people. The laws of nature have a statue [sic] of limitation, there are those who choose to ignore them for which all of us have to pay."

WILLIAM R. SULLIVAN
Los Angeles, Calif.

There—see what you've gone and done!

Family Album

This seems to be the month for pictures of the TI staff. Here's a photo furnished by the Business Department of TI; it was taken in an Atlantic City restaurant during the American Textile Machinery Exhibition, and it purports to prove that even these demon salesmen weren't selling advertising *all* the time.

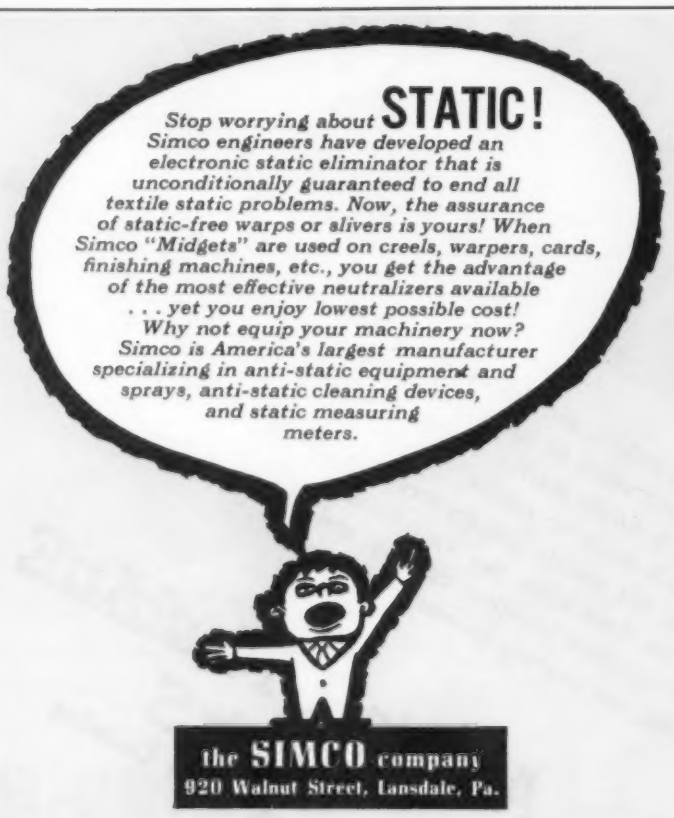
Reading from left to right, that's **Bill Hoffman,** TI's New York representative; **Walter Mitchell,** advertising manager; and **Cliff Rutland,** Carolinas-Virginia representative.

And then to wind up the family album, here's associate editor **Jess Ellington,** as he appeared to Walter Mitchell at the Atlantic City Show:

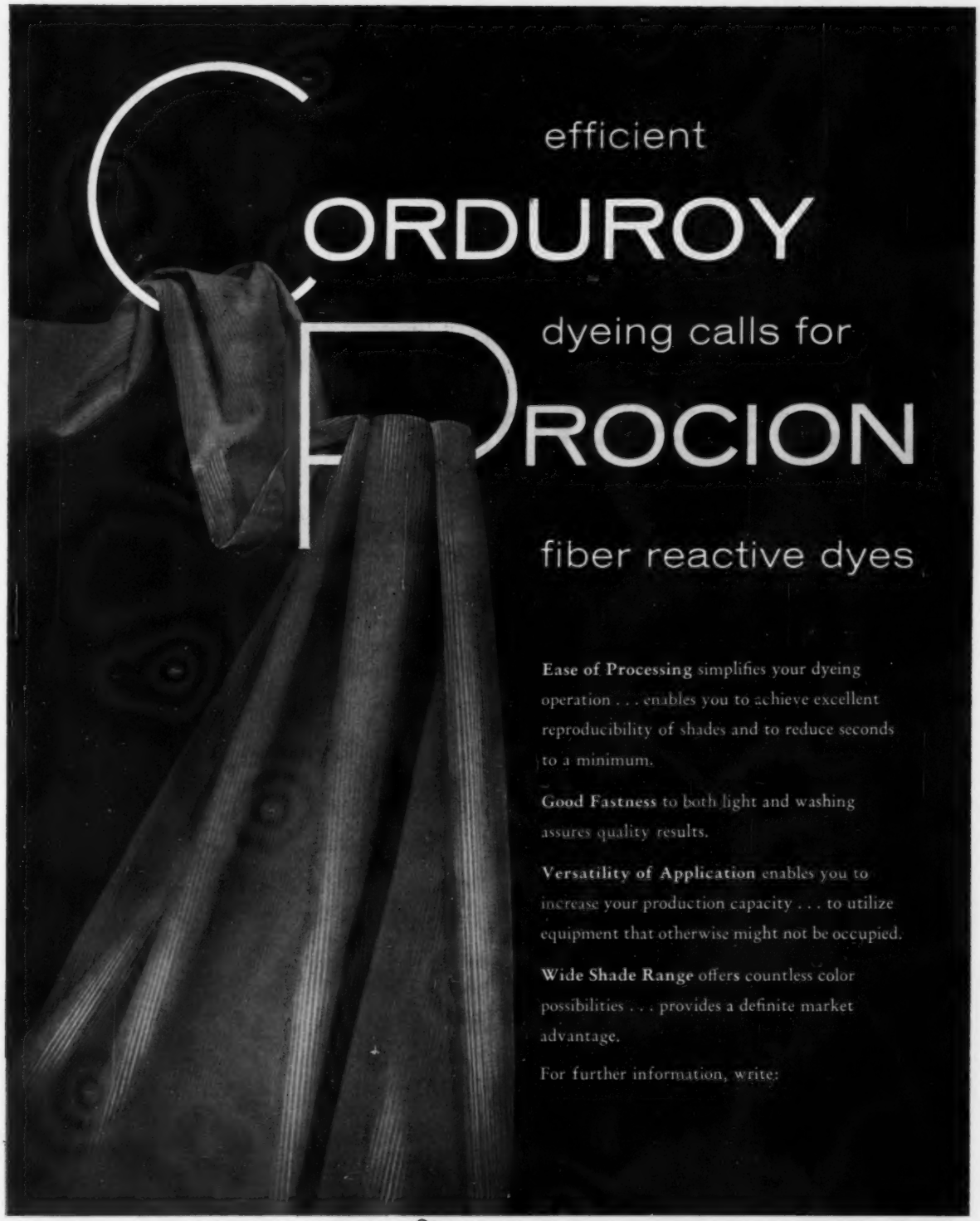
The bird in the picture is unidentified.

► Stop by again next month; we'll have a special feature on wet processing, with emphasis on printing, especially automatic screen printing. And there'll be another installment of the papers presented at this year's Cotton Research Clinic.

Stop worrying about **STATIC!**
Simco engineers have developed an electronic static eliminator that is unconditionally guaranteed to end all textile static problems. Now, the assurance of static-free warps or slivers is yours! When Simco "Midgets" are used on creels, warpers, cards, finishing machines, etc., you get the advantage of the most effective neutralizers available . . . yet you enjoy lowest possible cost! Why not equip your machinery now? Simco is America's largest manufacturer specializing in anti-static equipment and sprays, anti-static cleaning devices, and static measuring meters.



the SIMCO company
920 Walnut Street, Lansdale, Pa.


efficient
CORDUROY
dyeing calls for
PROCION
fiber reactive dyes
Ease of Processing simplifies your dyeing operation . . . enables you to achieve excellent reproducibility of shades and to reduce seconds to a minimum.
Good Fastness to both light and washing assures quality results.
Versatility of Application enables you to increase your production capacity . . . to utilize equipment that otherwise might not be occupied.
Wide Shade Range offers countless color possibilities . . . provides a definite market advantage.
For further information, write:

Procion and the processes for its use and application to textiles are the subject of patents and patent applications in the U.S.A. Trademarks of I.C.I. Ltd.
103-0

Quality AHCO PRODUCTS Integrity

ARNOLD, HOFFMAN & CO., INCORPORATED
55 Canal Street, Providence, Rhode Island • Est. 1815
A Subsidiary of Imperial Chemical Industries Limited, England
West Coast Representative: Chemical Manufacturing Company, Incorporated of California

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

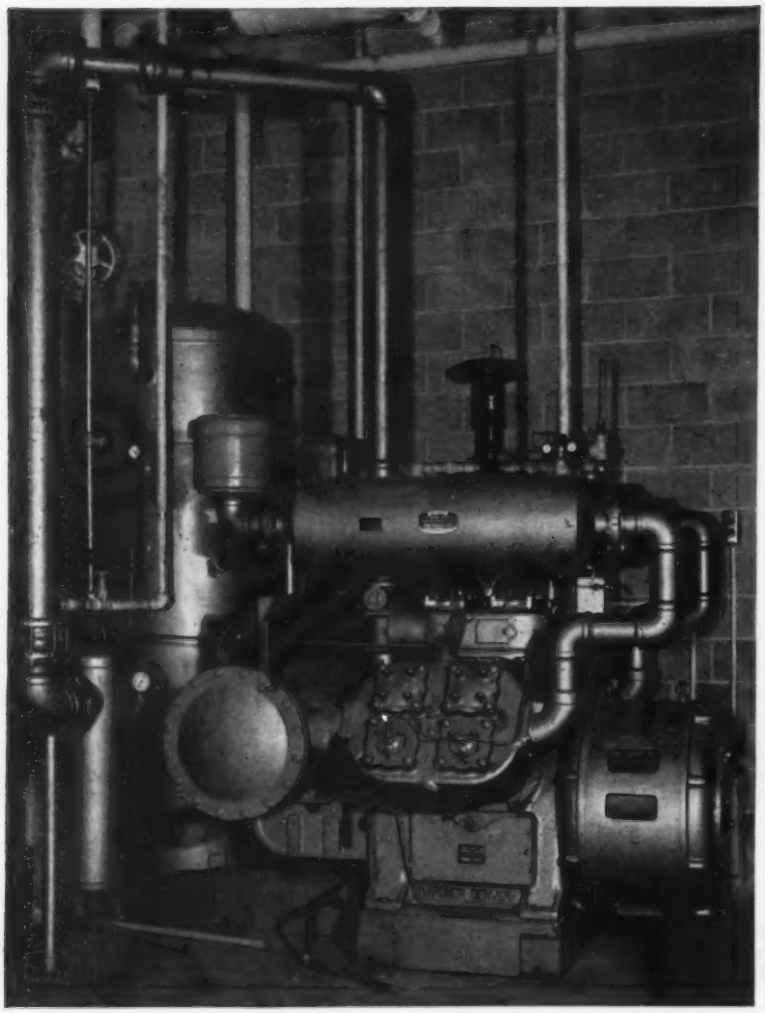
GARDNER-DENVER Since 1859

GARDNER DENVER

The Gardner-Denver WB—everything you could want in an air compressor. And look how compact this space-saver is. You quickly spot it in a corner, hook it up, and it runs for years without the touch of a wrench.

The illustration below is typical of a complete WB air compressor package available from Gardner-Denver. It includes moisture separator, clean air aftercooler, air receiver and automatic controls. Save floor space dollars and get a lasting supply of compressed air with a Gardner-Denver WB. There are eight space-saving sizes. Write for Bulletin WB-10 or consult your Gardner-Denver compressor specialist.

Space-Saving Cost-Cutter



PERSONAL NOTES

At the annual convention of the South Carolina Textile Manufacturers Association held at Sea Island, Ga., recently, **George P. McClenaghan,** vice-president of J. P. Stevens

Left to right: Frederick B. Dent, outgoing president; Mr. McClenaghan and Mr. Roberton.

& Co., Inc., was elected president. **William F. Robertson,** vice-president of Riegel Textile Corp., was elected vice-president. Newly elected members of the board of directors include **P. C. Gregory,** Union Bleachery; **C. H. Coggin,** Columbia Mills; **R. S. Small,** Woodside Mills; **Robert B. Vance,** Clinton-Lydia Mills.

Stephen Dunton has been elected a vice-president of Chicopee Mills, Inc. Mr. Dunton will continue in his capacity as manager of the grey goods division.

Professor Thomas Edman, head, knitting department of Philadelphia Textile Institute, was awarded an honorary Doctor of Textile Science degree at the 76th commencement exercises held recently. At the same time, **Merwin R. Haskel,** president of United Merchants and Manufacturers, Inc., received the honorary degree of Doctor of Laws.

Leonard S. Little has been named recipient for the 1960 Harold C. Chapin award of the American Association of Textile Chemists and Colorists. The award is presented annually at the AATCC National Convention to a senior member of at least twenty years continuous membership, who has contributed out-

PERSONAL NOTES

(from page 26)

standing service in enabling the association to attain the objectives for which it was founded. * * * **Arnold M. Sookne** has been named to receive the 1960 Olney medal for outstanding achievement in the field of textile chemistry.

At the annual convention of the Tufted Textile Manufacturers Association held in Miami Beach, Fla., recently, **A. L. Zachry, Jr.**, of G. H. Rauschenberg Co., Dalton, Ga., was elected president. Vice-presidents elected were: **I. V. Chandler,** Patcraft Mills; **Leonard Lorberbaum,** Lawtex Corp.; **James T. Porter,** Tifton Rug Mills; **Arthur N. Richman,** Art-Rich Mfg. Co.

Maurice D. Holmes has been named manager of the new product development department of Wunda Weave Carpet Co., and **Edward J. Doyle** has been appointed assistant manager. **John Fonville** has been named a special assistant to Mr. Holmes. **Walter Cullars** has been named for the new position of director of design and color styling. * * * **Numa Martin** and **Lynn A. Hendricks** have joined the company as industrial engineers. * * * **Lester Nance** has been appointed special mechanical technician for knitting and tufting.

The board of governors of the American Association for Textile Technology has appointed the first technical council as follows: Chairman—**Kurt J. Winter.** Alternate Chairman—**Giles E. Hopkins.** Others selected were: **Stanley Backer,** professor mechanical engineering, M. I. T., Cambridge, Mass.; **Erb. N. Ditton,** textile consultant, New York City; **Ephraim Freedman,** director, Macy's Bureau of Standards, New York City; **Walter J. Hamburger,** director and treasurer of Fabric Research Laboratories, Inc., Dedham, Mass.; **Stephen J. Kennedy,** research director, Quartermaster Corps, U. S. Army, Natick, Mass.; **Richard T. Kropf,** vice-president of Belding Heminway Co., Inc., New York City; **Gerard K. Lake,** vice-president of Burlington Industrial Fabrics Co., New York City; **William A. Newell,** director, textile research center, North Carolina State College, Raleigh, N. C.; **Edgar L. Schlesinger,** vice-president of United International Corp., New York City; **Arthur M. Spiro,** vice-president of Waumbec Mills, Inc., New York City; **Paul B. Stam,** director of research

Continued on page 30

WORK HORSE... RACE HORSE

Gardner-Denver piston and rotary air hoists

Only Gardner-Denver offers lightweight overhead air hoists for *both* the "work horse" and "race horse" jobs. Axial-piston hoists provide rugged, dependable operation with the control demanded for precise spotting. That's why hundreds of industrial plants rely on this Gardner-Denver hoist. New rotary air hoists are designed for use where the combination of speed and ruggedness is of primary importance—up to 90 fpm in 500-lb. capacity.

Popular models available from 150-4000 lb. Sparkproof construction and pendent control available.

PISTON HOISTS				ROTARY HOISTS			
MODEL	CAPACITY	SPEED	WEIGHT	MODEL	CAPACITY	SPEED	WEIGHT
86-1V10	1000	19	28	86R-5	500	90	27
86-2V20	2000	19	78	86R-10	1000	40	27
86-2V40	4000	10	100	86R-20	2000	20	30

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

GARDNER-DENVER

Gardner-Denver Company, Quincy, Illinois

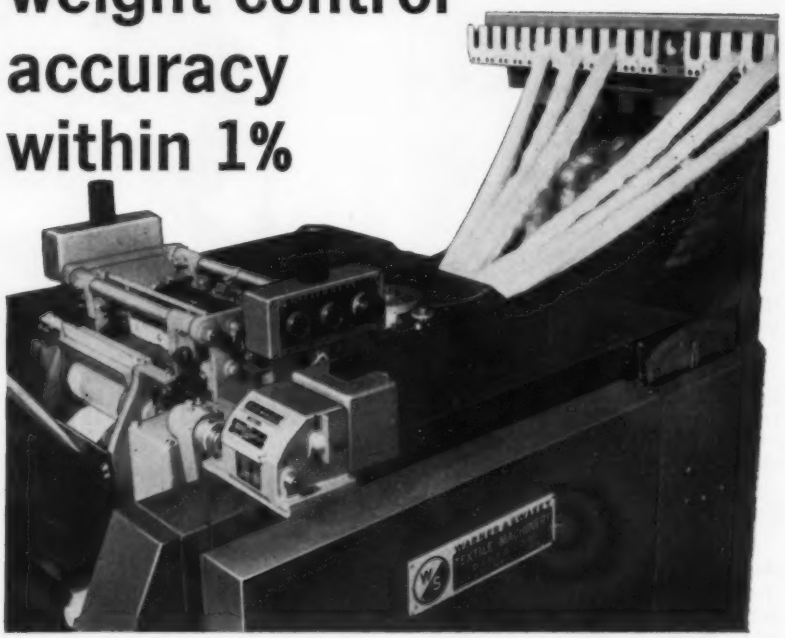
Branch Offices: Atlanta, Ga.; Birmingham, Ala.; Knoxville, Tenn.; Washington, D. C.; Teterboro, N. J. (New York Office); Philadelphia, Pa.; Pittsburgh, Pa.; New Orleans, La.; Louisville, Ky.

NEW WARNER & SWASEY SERVO-DRAFTER

provides weight control accuracy within 1%

Measuring rolls, *acting as a "sensing device", detect minute variations in weight of entering stock. These variations are automatically transmitted to a rotating memory wheel.*

Memory Wheel *introduces a time delay in machine response, allowing entering stock to travel from measuring rolls to draft rolls, and indicates changes in faller bars speeds.*



This new single head, single delivery Servo Drafter Intersecting Draw Frame has proven that it will produce higher quality yarns by maintaining consistent yard-for-yard sliver weight.

Extensive tests in various leading mills indicate that you can expect weight control accuracy within 1%. In a single draft, the machine can correct infeed weight variations of ± 25% in wools, synthetics or blends. Calibration of the servo control during stock change-over is simple and can be done while the machine is running.

The new machine, which operates at a mean speed of 1500 D.P.M. retains all of the time-tested features of the Warner & Swasey Pin Drafter®, utilizes a combination hydraulic and mechanical system for simple maintenance and long-term operating dependability. It takes the same floor space as previous models.

For complete facts on how this machine will fit into your blending, precombing, top making and drawing room operations, get in touch with our nearest sales office.

® Reg. U. S. Pat. Off.

You can produce it better, faster, for less... with a Warner & Swasey

TEXTILE MACHINERY SALES OFFICES — Main Office and Factory: 5701 Carnegie Ave., Cleveland 3, Ohio • P.O. Box 215, 20 Chestnut Street, Needham 92, Mass. • P.O. Box 4000, 624 Pecan Avenue, Charlotte 4, N. C. • Suburban Square Bldg., Ardmore (Philadelphia), Pa.

Eastman now offers textile finishers 3 basic types of polyethylene

New EPOLENE resins enable textile chemists to formulate broader range of softeners

The wide range of properties now available in Eastman's Epolene series provides greater flexibility in formulating polyethylene emulsions for softening "wash and wear" cottons and synthetics, and for textile lubricants and sizes.

Permanent, low in color, non-chlorine retentive and easy to prepare, emulsions based on Epolene polyethylene give you a practical and economical method for improving the hand, abrasion resistance and tear resistance of "wash and wear" treated fabrics.

With Epolene, you can prepare any kind of emulsion system, cationic, anionic or non-ionic, with solids contents of up to 40%.

Choose from three different low-molecular-weight resins to obtain the right emulsion properties and finishing characteristics for your equipment and service.

Epolene E is the highest-molecular-weight resin of the three. It produces stable, low-color emulsion systems of superior quality for use in softening cottons or synthetics, or as a lubricant to reduce needle-cutting and increase sewability. Like other Epolene resins, it needs no curing, lasts through repeated launderings and resists dirt pick-up and redeposition.

Epolene LVE, a new resin type, has a lower melt viscosity than has Epolene E, thus offering somewhat better handling characteristics. Epolene LVE is softer than other resins in the series. The stability of its emulsions in the presence of resin catalysts is outstanding, especially at the low end of the pH scale, as indicated by its relatively high HLB factor.

Epolene HDE is the first high-density, emulsifiable low-molecular-weight polyethylene on the market. Because it is much harder, it improves significantly the abrasion resistance and tear resistance in cotton and cotton blends. Its stability and permanence are excellent. It, too, offers easier handling characteristics during emulsion preparation because of its low melt viscosity.

If you are formulating polyethylene softeners and would like to produce stable, economical emulsion systems of superior all-'round characteristics, look to Epolene from Eastman. Let us introduce you, also, to new time-saving and cost-cutting emulsifying techniques developed at our textile laboratories. For more information on the formulating and performance advantages of these superior polyethylene resins or for specific formulating assistance, write your nearest Eastman office. We invite your inquiry.

Property	Epolene E	Epolene LVE	Epolene HDE
Molecular Weight	2500	1500	1500
Density	0.938	0.939	0.956
Ring and Ball Softening Point, °C. (ASTM D-36-26)	104-108	104-105	110-111
Penetration Hardness (100 g./5 sec./77°F., tenths of mm.)	2	5	1
Color (liquid), Gardner scale, max.	2	2	2
Brookfield Viscosity (cps. @ 120°C.)	1500	400	455

Epolene

EASTMAN low-molecular-weight polyethylene resins

SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tennessee; Atlanta; Chicago; Cincinnati; Cleveland; Detroit; Framingham, Massachusetts; Greensboro, North Carolina; Houston; New York; Philadelphia; St. Louis. **West Coast: Wilson and Geo. Meyer & Company,** San Francisco; Los Angeles; Portland; Salt Lake City; Seattle.

For Micronaire testing . . .

IMPROVED...

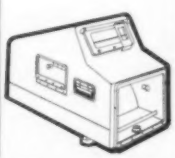
Faster-weighing, easier-reading SHADOGRAPH® Scales

A new optical system, developed by The Exact Weight Scale Company, provides the Shadograph with greater-than-ever visible accuracy. Its shadow-edge indication is sharper, easier to read, and contributes to faster operation.

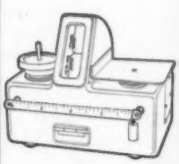
Model 4104-A, above, is specially designed for weighing samples in conjunction with the Sheffield Micronaire testing machine. Dial is graduated with 1 inch of indicator travel equal to 15 grains, over and under.

Extreme accuracy, plus greater speed and easy-to-read indication make Shadograph the choice of cotton shippers, brokers and mill operators both here and abroad. The Shadograph is another precision product of Exact Weight, leading manufacturer of job-engineered scales for more than 45 years.

Model 103 Exact Weight Scale for control of cone and spool weight.

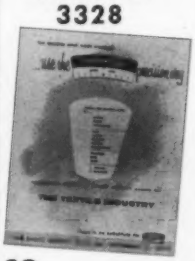


Model 4142 Shadograph for determining yarn count number. Direct-reading eliminates use of conversion tables.



Shadographs are available for color control, slashing, sliver test, denier test and check-weighing operations.

WRITE FOR BULLETIN 3328



Exact Weight SCALES

THE EXACT WEIGHT SCALE CO.
922 W. FIFTH AVE., COLUMBUS 8, OHIO
In Canada: 5 Six Points Road, Toronto 18, Ont.

Sales and Service Coast to Coast

Find us in your local 'Yellow Pages'

BETTER QUALITY CONTROL . . . BETTER COST CONTROL

PERSONAL NOTES

(from page 27)

for J. P. Stevens & Co., Inc., Greensboro, N. C.; **Michael H. Strub, Jr.**, manager technical department of The Duplan Corp., Winston-Salem, N. C.; **Philip Wick**, president of Philip Wick Co., Inc., New York City. The duties of the council will include the investigation of proposals for technical activities in AATT, recommendations to the board for suitable action on such proposals, and such other technical activities as may be within the interest of the association.

At the 62nd commencement exercises of Lowell Technological Institute held recently, **Francis W. Gainey** received the honorary degree, Doctor of Science. Mr. Gainey has been associated with Pacific Mills, Dominion Textile Co. in Canada, and Cheney Bros. Silk Mills; and has also been connected with E. I. du Pont de Nemours & Co., Inc., and Allied Chemical Co., Inc., on research problems concerning the application of color to textiles. Mr. Gainey is a member of the LTI board of trustees.

Roy M. Stephens, vice-president and general superintendent of Dan

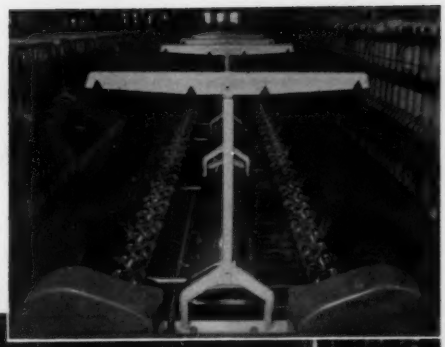
River Mills, Inc., has been elected to the board of directors of Woodside Mills, a Dan River subsidiary.

Arthur Eugene Wullschleger, chairman of the board of directors of Wullschleger & Co., Inc., recently presented examples of hand-screened printing and the equipment used in the silk-screening process to the textile division of The Smithsonian Institution.

A. W. Gunn, vice-president of Callaway Mills Co., LaGrange, Ga., has resigned. * * * **James A. Ash** has been promoted to recreation supervisor. * * * **Tyler C. Morgan** has been transferred from the Milstead to Unity Spinning as overseer of weaving. * * * **Murry Williamson** has been named plant engineer at Calumet. **Herbert N. Jones** has joined

Continued on page 32

Why the stamped steel cross-arms are notched



on the Bahnson Open-Aire Creel

Fundamental in Open-Aire Creel's special stamped steel construction for extra strength are the deep drawn steel cross-arms notched for maximum lateral rigidity. Longitudinal runners of stamped steel or extruded aluminum are fastened in the notches on the cross arms, thus fewer lint catching areas are exposed resulting in cleaner creel surfaces.

You get these additional benefits:

- baked enamel steel surfaces for less lint accumulation and for eliminating etching and corrosion
- slotted bobbin holder rails for flexible package positioning
- weight wire positioners to keep weights in correct operating position
- custom designed creel arrangements to suit your spinning requirements — 4/0, 4/2, 6/0, 6/2.

For consultation on your creel needs, clip coupon to letterhead and mail today.

Name_____

Bahnson

AIR-O-MATION

THE BAHNSON COMPANY • WINSTON-SALEM, N. C.

NEW TAPE *Skein Dyeing*

ZIPPER TAPES AND OTHER NARROW FABRICS MAY NOW BE DYED IN SKEIN FORM IN THIS NEW MACHINE.

NOTE THESE FEATURES

- Skeins are suspended between stainless steel dyesticks
- Dyeing done in a relaxed condition
- No snagging—no place for tapes to catch
- Air operated front door
- Handles any material—natural or man made
- Steam coil for indirect heating
- Dye and chemical feed system providing even distribution
- Capacity rated from 100-500 lb.—up to 100% overload under favorable conditions
- Complete line of models from 10-50 sticks

KLAUDER WELDON GILES

MACHINE COMPANY

ADAMS AVENUE & LEIPER STREET
PHILADELPHIA 24, PA.

PERSONAL NOTES

(from page 30)

Mr. Philip

Mr. Ash

the company as trainee. * * * **John Coleman** and **Paul Kelly** are new methods analysts. * * * **Donald McCord** has been named product development engineer at the research and development division. * * * **Gary Keeble** has been promoted to plant engineer at the Hillside plant. * * * **Robert W. Philip,** vice-president, has retired. In making the announcement, Fuller E. Callaway, Jr., chairman of the board, said, "Bob Philip has made many valuable contributions to our company and to the American textile industry. He has served both faithfully and tirelessly in many places of leadership. He carries with him our very best wishes for the future." For 25 years prior to 1944 when he joined Callaway, Mr. Philip was an editor of this magazine (see page 14 of this issue).

T. Crenshaw of Spindale Mills has been elected chairman of the cotton buyers and classers division of the North Carolina Textile Manufacturers Association. **F. M. Arthur** of Textiles, Inc., was elected vice-chairman. **T. A. Moore** of Sterling Spinning Co., and **D. R. Lafar, 3rd,** of Lafar Mills were named to the executive committee.

Chris T. Wagner, superintendent of dyeing at the Albemarle, N. C., plant of Collins & Aikman, has retired.

J. Clyde Simmons, formerly plant manager at Kingsley Mill Corp., Inc., Thomson, Ga., has been named plant manager of the Gerrish Milliken Mills, Pendleton, S. C. **J. E. Whatley** has been promoted to plant manager of Kingsley.

L. D. Purkis, formerly assistant treasurer, has been elected treasurer of Caron Spinning Co., Rochelle, Ill.

Harold Welburn, manager of the

Continued on page 196

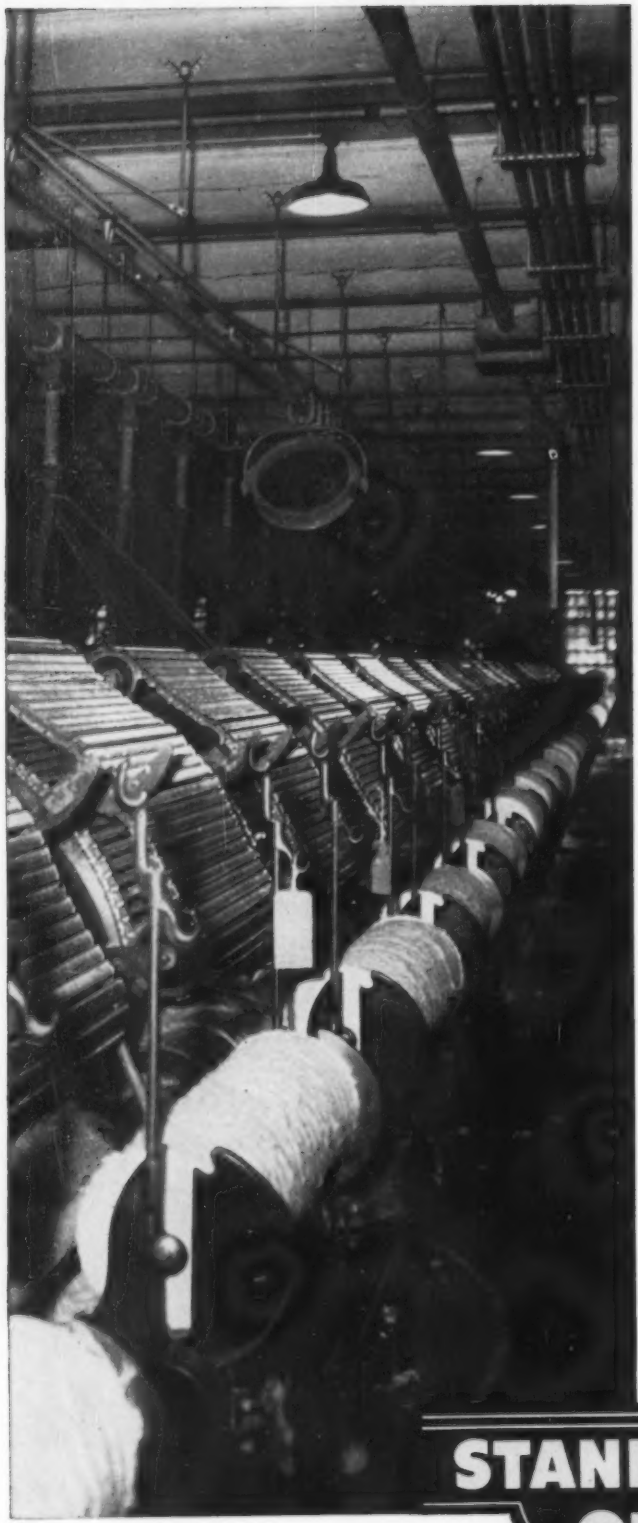
Fine Finishes
make Better Fabrics
If you like to talk to men who speak your language, talk to the friendly Scholler Man who visits you. You'll find him a mighty interesting fellow with a fine technical background and a wealth of experience. It's his business to serve your business. He's there to help you as well as sell you . . . help you technically, anywhere, anytime, without cost or obligation . . . sell you only, if what he has to offer will do the job better, faster or more economically. Get to know the Scholler Man who calls upon you—and the fine line of superior textile chemicals and finishes by Scholler!
Dura Beau®
...resin finishes for the enhancement of fabric characteristics and stability.
DURASEPTIC®
...a durable, non-toxic bactericidal finish additive that provides excellent aseptic and perspiration odor-resistant properties in fabrics.
Larolized®
...the "skin-compatible" finish for fabrics of almost all fibers and blends.
POLYEEN®
...a finish designed to minimize the harshness in wash-and-wear fabrics.
HYSORB®
...a finish that provides "absorbency" in moisture-resistant fabrics.
Creamoyl®
...a group of economical softeners for improved "hand" in fabrics of natural or man-made fibers.

Scholler BROTHERS, INC.

PIONEERS IN THE BETTER FINISHES THAT MAKE THE BETTER FABRICS...SINCE 1907

Collins & Westmoreland Streets, Philadelphia 34, Penna. IN CANADA: Scholler Brothers, Ltd., St. Catherines, Ont.

Manufacturers of Textile Finishes, Resins, Softeners, Detergents, Soaps, Oils and Specialties.



a long array of years

For seventy-four years the Southern textile industry has relied upon Standard Oil lubricants to do a dependable protective job with maximum economy.

During this long array of years, we have pioneered in offering new lubricants to meet changing machinery, because the combined facilities for testing and research behind Standard Oil lubricants are unequaled. These facilities are available to tackle your problems whether they are "run of the mine" or involve a new or unusual lubricant application.

STANDARD OIL LUBRICANTS

STANDARD OIL COMPANY
(KENTUCKY)

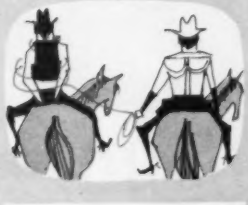
(audio)
If you handle a continuous web of textiles...

(audio)
You can . . . wash it

(audio)
. . . print it

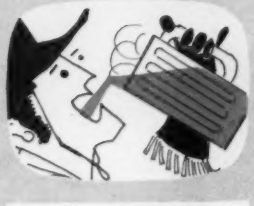
(audio)
. . . emboss it

(audio)
. . . coat it



(audio)
. . . guide it

(audio)
. . . mercerize it



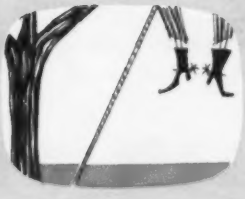
(audio)
. . . wet it

(audio)
. . . bleach it

(audio)
. . . dry it

(audio)
. . . cut it

(audio)
. . . wind it



(audio)
. . . stretch it

(audio)
. . . shrink it

(audio)
. . . dye it

(audio) **All in Butterworth Machines**

Go BUTTERWORTH young man!

H. W. BUTTERWORTH & SONS COMPANY
Division of Van Norman Industries, Inc.
BETHAYRES, PA. • SINCE 1820

In the South: Industrial Heat Engineering Co., Greenville, S. C.
In the North: United States Supply Co., E. Providence, R. I.

Standard ALSiMAG® *guides*

in the **right material** for **your job!**

Here are a few of many standard AlSiMag guide designs ready for shipment

Advantages important to your mill are offered by AlSiMag:

Choice of Materials. A whole family of materials for the textile field, each with advantages for a particular application. Electrically conductive AlSiMag 193, for example, aids in the control of static.

Finer Quality. Homogeneous—no point of sudden failure. Smooth. Hard. Uniform. Dimensionally accurate. Help achieve more uniform tensions to improve product quality. Precision tolerances.

Longer Life. Tests on finer denier synthetic yarns at high speeds and tensions proved in every case reported to us that AlSiMag guides far surpassed those previously used. Fewer replacements; less down-time.

Controlled Finishes. AlSiMag guides can be supplied in a wide range of finishes —from 4 to 80 RMS micro inches—uniform from part to part and from lot to lot. Wonderful for lighter tensions!

TEST SAMPLES ON REQUEST.

SHOWN APPROX. ACTUAL SIZE

If you don't see the guides you need on this page, send us complete details. We can give you speedy service on custom designs. Custom samples for test can be produced promptly at reasonable cost. Write today.

A Subsidiary of Minnesota Mining and Manufacturing Company

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Nacconol NR Flake!

40% Alkyl Aryl Sulfonate

It's a fact . . . you save money two ways when you use NACCONOL NR!

First you save because you use less! Low concentrations of NACCONOL NR are extremely effective in scouring, wetting, emulsifying and other wet processing operations.

Second, you save still more by minimizing waste. You can accurately determine . . . and use . . . the precise amount of NACCONOL NR needed to get consistent results day after day. NACCONOL NR is unfailingly uniform, stable to pH and processing chemicals and doesn't form efficiency-destroying, insoluble hard water soaps.

Our nearest office will be pleased to send you samples of NACCONOL NR and other forms of NACCONOL recommended for textile use.

OTHER TEXTILE NACCONOLS

NACCONOL SL Liquid
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Which of these 5 products and services can you use... from

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Becco Chemical Division
STATION B, BUFFALO, NEW YORK

Solve Dye Problems with BECCO Silicate-Free Bleaching

"We dyed half a million yards this week... with no rejects!"

So reports a new user of Becco Silicate-Free Bleaching Process,* who previously suffered up to 25% rejects.

When complex silicates of calcium and magnesium formed scale on equipment and left resistant residues in the cloth, a Becco Sales Engineer studied the situation, and recommended Silicate-Free Hydrogen Peroxide bleaching solutions which eliminated the problem.

Silicate-Free bleaching won't answer **every** textile bleaching problem. But chances are one Becco process or another **will.** If you need help, use the coupon below to request a Sales Engineer's call. Also, ask for your free copy of Bulletin No. 71, "Continuous Bleaching of Cottons with Silicate-Free Peroxide Solutions".

*U.S. Patents 2,740,689 and 2,820,690

BECCO fmc

BECCO CHEMICAL DIVISION, FMC
Station B, Buffalo, New York
Dept. TI-A

Gentlemen:

☐ Please send a free copy of Becco Bulletin No. 71.

☐ Please have a Sales Engineer call.

NAME_____

FIRM_____

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ZONE____ STATE_____

Problems in handling Hydrogen Peroxide

?

Becco's Four-Fold Engineering Service Program—offered free—includes:

1. Comprehensive survey of your facilities.
2. Specific proposal with recommendation of proved equipment and where it is obtainable.
3. Installation supervision by Becco.
4. Periodic inspection and permanent service.

Can you use this free Becco help, based on more years of experience with bulk handling of H_2O_2 than any other manufacturer? Use the coupon to let us know.

BECCO fmc

BECCO CHEMICAL DIVISION, FMC
Station B, Buffalo, New York
Dept. TI-B

Gentlemen:

Please tell me more about your Four-Fold Engineering Service.

NAME_____

FIRM_____

ADDRESS_____

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What's a PEROXYGEN?

Fact is, "peroxygen" is a word that Becco uses to indicate that we can tie oxygen onto just about anything.

How come? Well, years of experience in producing Hydrogen Peroxide has produced an affinity between Becco and oxygen — an affinity we have capitalized on to give you compounds that will provide a ready source of oxygen — wherever, however and whenever you need it.

We have a good number of such compounds on the shelves. Quite a few others are in development. Still others are merely in our minds, but we can begin drawing them out if you're interested.

We hope you **are** interested. But we'll never know—unless you fill in the coupon below and mail it to us. Why not?

BECCO fmc

BECCO CHEMICAL DIVISION, FMC
Station B, Buffalo, New York
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Gentlemen:
Send me more information about Becco Peroxygen Chemicals.

NAME_____

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"Enclosing $1.00 — Send Patent License"

Well, perhaps there's a little more to your gaining use of Becco patents than just mailing your dollar in, but not much more. And certainly, no more money. The $1.00 really does cover it.

Becco has lots of patents, granted as a result of innovations in the use of Hydrogen Peroxide and other Peroxygen chemicals developed in Becco's Research Laboratories. But they don't do us a whole lot of good locked tightly in our safe. So, we long ago adopted the following policy:

If one of our patents can help you, we'll be glad to license the rights to you **perpetually**, for just one dollar. You get a nice certificate, incidentally, to cover the legalities, but more important — you also get free our complete engineering help in setting up your process, handling the material, maintenance, etc., etc.

What do **we** get? You as a **customer** — we hope — but there's no obligation on your part. Just seems to work out that way, though — when we know enough about a particular peroxygen to hold a patent on its use, chances are we've also learned enough to produce it purer than anyone else. You benefit from this; we do, too.

Use the coupon below to ask for a Sales Engineer — or our list of patents — that may help you solve an important problem.

BECCO fmc

BECCO CHEMICAL DIVISION, FMC
Station B, Buffalo, New York
Dept. TI-F

Gentlemen:
Please send your list of patents available on the use of

- ☐ Hydrogen Peroxide
- ☐ Peroxygen Chemicals
- ☐ Persulfate Chemicals
- ☐ Please have a Sales Engineer call.

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TECHNICAL BULLETINS

We got 'em—
You can have 'em!
They're FREE!

Years of experience in textile processing have produced a library of technical information which is available in individual bulletins, free on request. Use the coupon below to let us know which you'd like to receive.

No. 29 — Hydrogen Peroxide Dry-In Process for Bleaching Wool.

No. 35 — Modification of Wool with Peroxygen Compounds.

No. 43 — Treatment of Cellulose and Cellulose Derivatives with Peroxygen Compounds.

No. 52 — Bleaching with Some Peroxygen Chemicals.

No. 53 — Fluorescent Agents in Peroxide Bleaching of Knit Goods.

No. 60 — Successful Bleaching of Types 670 and 200 Nylon With Peracetic Acid.

No. 61 — Knit Goods Bleaching Range.

No. 71 — Continuous Bleaching of Cottons with Silicate-Free Peroxide Solutions.

No. 75 — Oxidation of Dyes On Cottons and Synthetics with Peroxygen Chemicals.

No. 88 — Progress in the Art of Bleaching.

BECCO fmc

BECCO CHEMICAL DIVISION, FMC
Station B, Buffalo, New York
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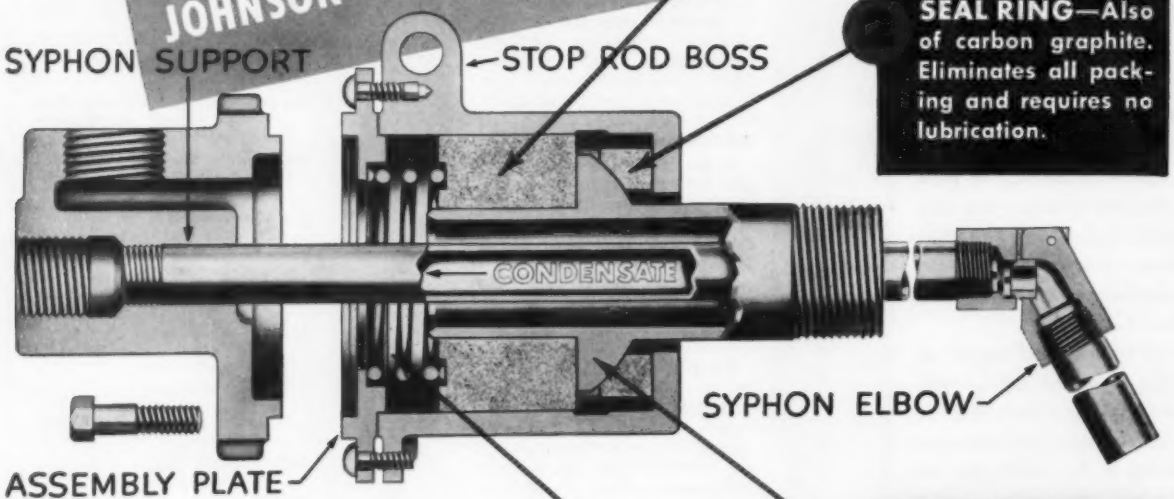
Only 4 INTERNAL PARTS

This is the one to use...
For 23" dia. Dry Cans

TYPE SB2-P
JOHNSON JOINT and JOHNSON SYPHON ELBOW



GUIDE—Makes the joint self-supporting. It is of self-lubricating, long-wearing carbon-graphite.

SEAL RING—Also of carbon graphite. Eliminates all packing and requires no lubrication.

NIPPLE—Rotates with the roll, and seals against the ring.

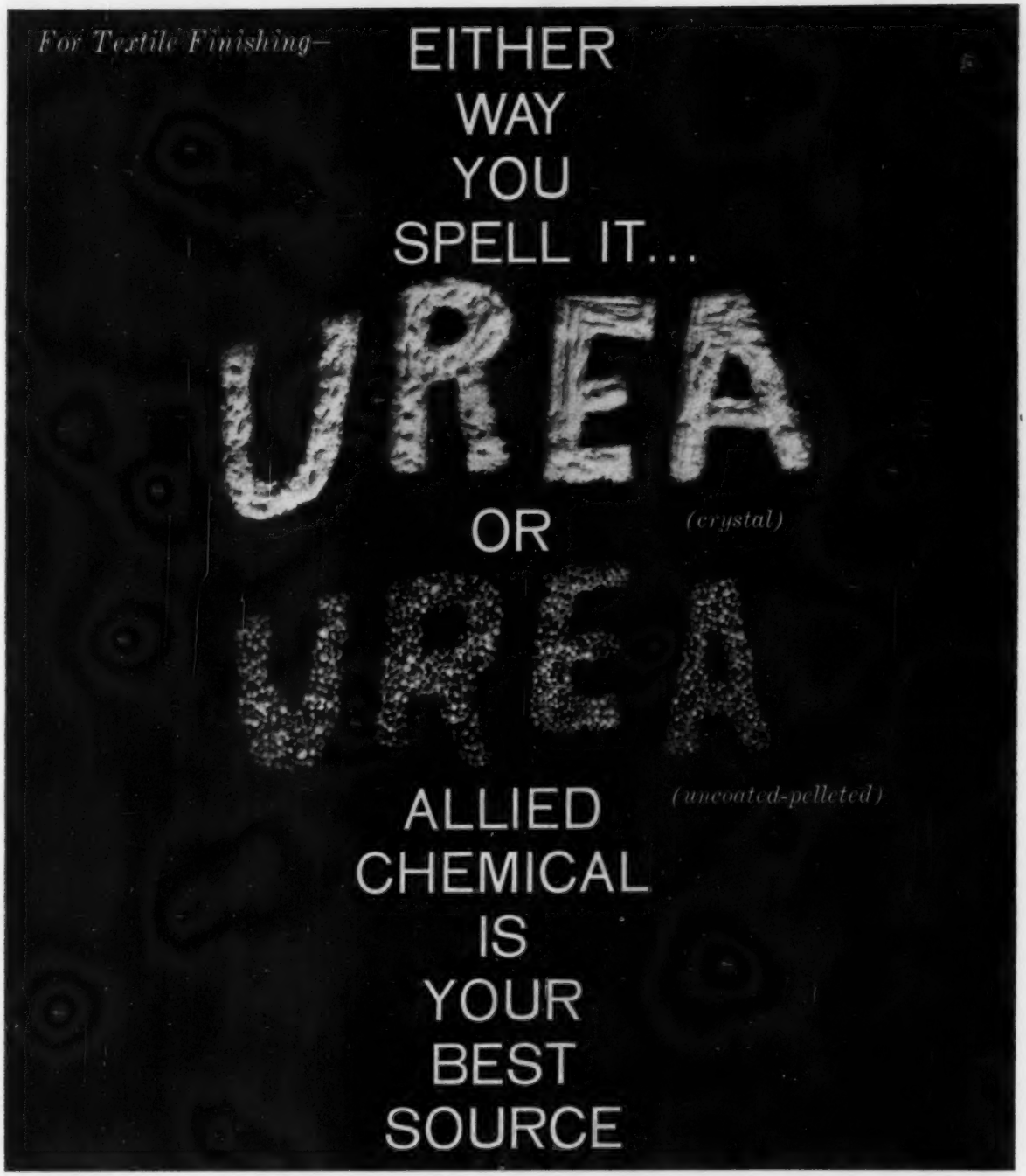
SPRING—Serves for initial seating only. In operation joint is pressure sealed

Notice how straightforward and simple is the design of this Johnson Joint. This unmatched simplicity means fewer breeding places for trouble... simplifies overhaul and repair out in the field. At the same time the joint is completely packless, self-adjusting, self-lubricating and self-supporting.

In this Series 3000 Type SB2-P the assembly plate holds the internal parts in position when head is removed. This makes it a perfect teammate for the Johnson Syphon Elbow which can be inserted or withdrawn right through the joint.

Test it yourself—We'll gladly supply a pair of the units shown for 90 day trial right in your own mill; no obligation of course. Write for details and literature.

Products of The **Johnson Corporation**
815 WOOD ST., THREE RIVERS, MICH.
Rotary Pressure Joints • Compressed Air Separators and Aftercoolers
Direct Operated Solenoid Valves • "Instant" Steam Water Heaters



Whatever form of urea you need, you can count on Allied Chemical for fast service on a product of highest purity and uniformity.

Extremely valuable for textile applications, it's used: in acid and direct dyes for screen and roller printing; with starch and other materials for weighting, sizing and finishing; in flame-proofing compositions; and in resins to improve crush and crease resistance.

Allied Chemical Urea in uncoated, pelleted form is preferred by many textile users because of its free-flowing characteristics, and its ease of handling and storage. Both forms are supplied in the quantities to suit your special requirements.

Want full technical and price data? Write Allied Chemical . . . the country's first multi-plant producer of quality urea for industry.

For specifications and local offices, see our insert in Chemical Materials Catalog, pages 475-482 and in Chemical Week Buyers Guide, pages 37-44.

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Allied Chemical

NITROGEN DIVISION
Dept. U7-29-1, 40 Rector St., New York 6, New York

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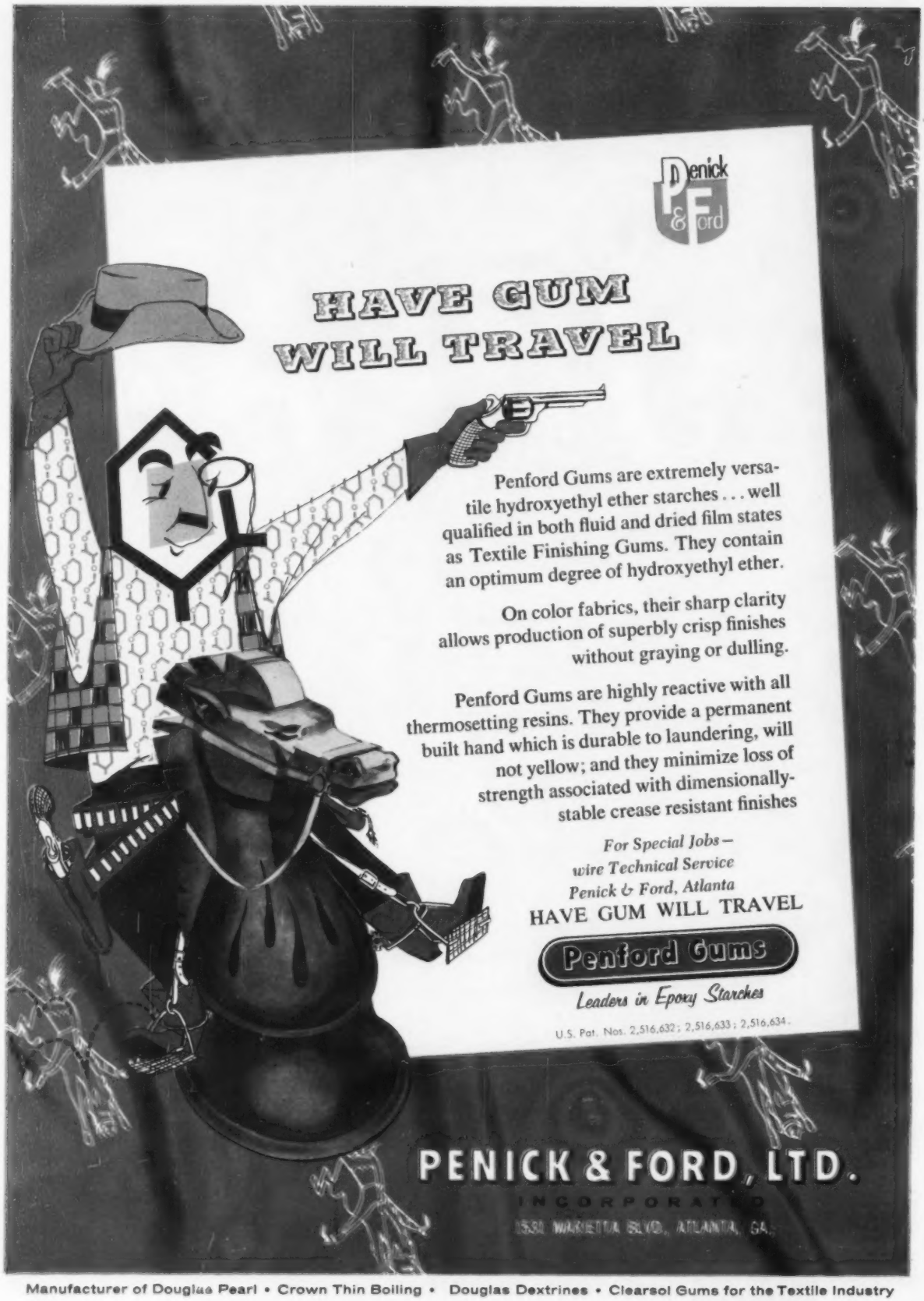
Penick & Ford
HAVE GUM WILL TRAVEL
Penford Gums are extremely versatile hydroxyethyl ether starches . . . well qualified in both fluid and dried film states as Textile Finishing Gums. They contain an optimum degree of hydroxyethyl ether.
On color fabrics, their sharp clarity allows production of superbly crisp finishes without graying or dulling.
Penford Gums are highly reactive with all thermosetting resins. They provide a permanent built hand which is durable to laundering, will not yellow; and they minimize loss of strength associated with dimensionally-stable crease resistant finishes
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HAVE GUM WILL TRAVEL
Penford Gums
Leaders in Epoxy Starches
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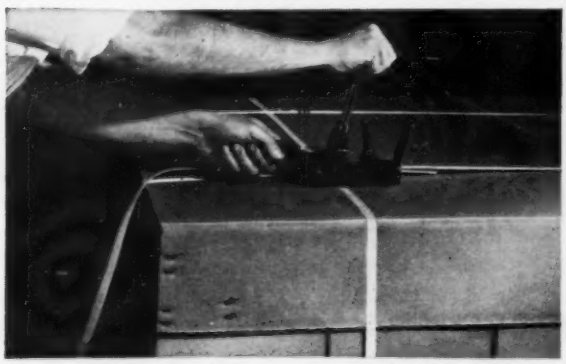
1531 MARIETTA BLVD., ATLANTA, GA.

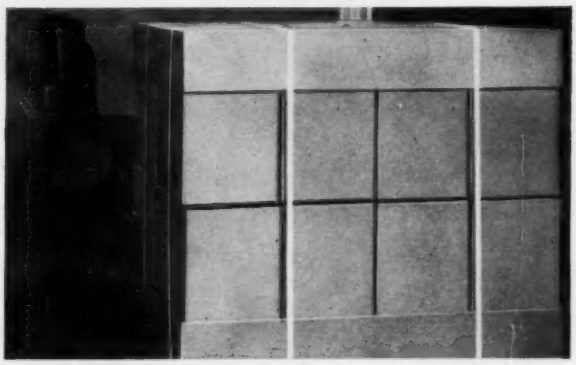
Manufacturer of Douglas Pearl • Crown Thin Boiling • Douglas Dextrines • Clearsol Gums for the Textile Industry

NEW SAVINGS

1 **New strapping material**—new low cost. Made of super-strong Avisco® rayon, AVISTRAP cord strapping costs less than metal strapping and reinforced tapes of comparable strength, offers many more important advantages.

2 **Easy handling, lightweight.** All coils of AVISTRAP cord strapping weigh 21 lbs. Yardage equals 100 lb. coil of comparable width steel strapping. Simple, low-cost dispensers permit replacement of coils in a few seconds.





3 **Low cost per package.** You invest less per package with AVISTRAP because its initial cost is low. In many instances, corner protectors can be eliminated. AVISTRAP is also extremely safe to handle, won't injure personnel.

4 **Saves on shipping costs.** AVISTRAP adds little weight to packages—as little as one-seventh the weight of steel strapping. Result: substantial savings for shippers. Also important, AVISTRAP won't damage merchandise.

AVISTRAP* CORD STRAPPING

Super Strength • Safety • Reduced Damage • Easy Handling • Locally Available

*Trademark of American Viscose Corporation. Patents pending.

AMERICAN VISCOSE CORPORATION, INDUSTRIAL PACKAGING DEPT.
1617 PENNSYLVANIA BLVD., PHILADELPHIA 3, PA.

Make Your Own Test (check to indicate request)

☐ Please send me sample and information.

☐ Please put me in touch with distributor nearest me.

Name_____

Title_____

Company_____

Address_____

City_____ State_____

For further information use Handy Return Card, Page 193

Soft, Softer...
SOFTENER "A"

Fancourt's WHITE CREAM Softener "A" is the first really effective softener for both — synthetics and mixed fibers!

Now you can make your naturals, cellulosics, and synthetics softer . . . Treated with Softener "A", they're far more resistant to yellowing, too — even at high temperatures, or during long storage. . . . IMPORTANT FOR ECONOMY: You treat with Softener "A" in equipment you're now using — quetch, pad, pressure machine, jig, overhead reel, or long liquor dyeing equipment. . . . Give yourself this big sales advantage . . . get proof of Softener "A" effectiveness from Fancourt today!

For complete details, write for Data Bulletin A-3

W. F. FANCOURT CO.

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SOLVING FINISHING PROBLEMS SINCE 1904

Southern Office: 309 E. Davis St., Burlington, N. C.; 1412 August Drive, Hixson, Tenn.
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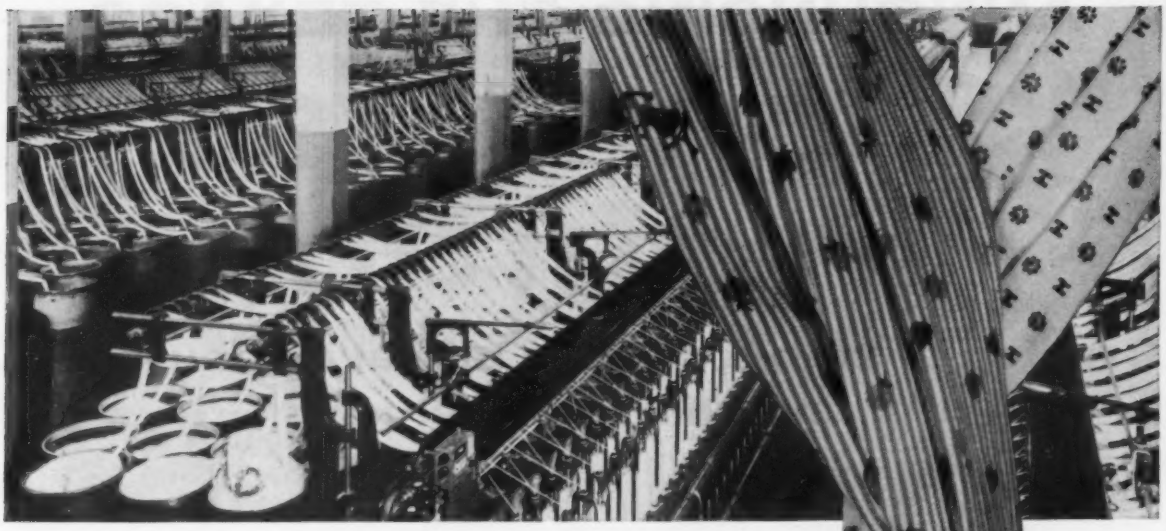


FROM CARDING TO FINISHED GOODS

You Can Count on STANDARD CHEMICALS

Quality right down the line—that's what you get with Standard Chemical's complete line of products for wet-processing. And no wonder! Standard chemicals are compounded from 100% pure components according to thoroughly tested formulas. Extensive research and more than 35 years of know-how assure their reliability.

And Standard's chemists help you stay ahead of the competition. All of these products reflect the latest developments in wet-processing natural and man-made fibers and fabrics... from carding straight through to finished goods. Check this line against your inventory:

Standapol and Stantex products for carding
Stantex Penetrator 40 for desizing and sulphuric acid bathing
Turpenol XXC for boiling
Pyrotex detergent for cleaning
Mercetex 756 for mercerizing
Penetrator 111 and Sanforol 50D for dyebaths...vat, sulphur, direct
Retardine and Retardine D for dispersing, retarding and leveling light and dark shades on difficult fabrics
Pyrotex, Stantex NR-2 and Standapon for cleaning dyed goods
Standapol 16, Stanset 130 and Stanset D 40 for finishing
Sanforol 50 for Sanforizing

Enjoy the convenience, cost-saving and fast-service advantages possible when you get all of your chemicals from one source. Let Standard help you solve your wet-processing problems. Write today for full information about our line and free technical service.

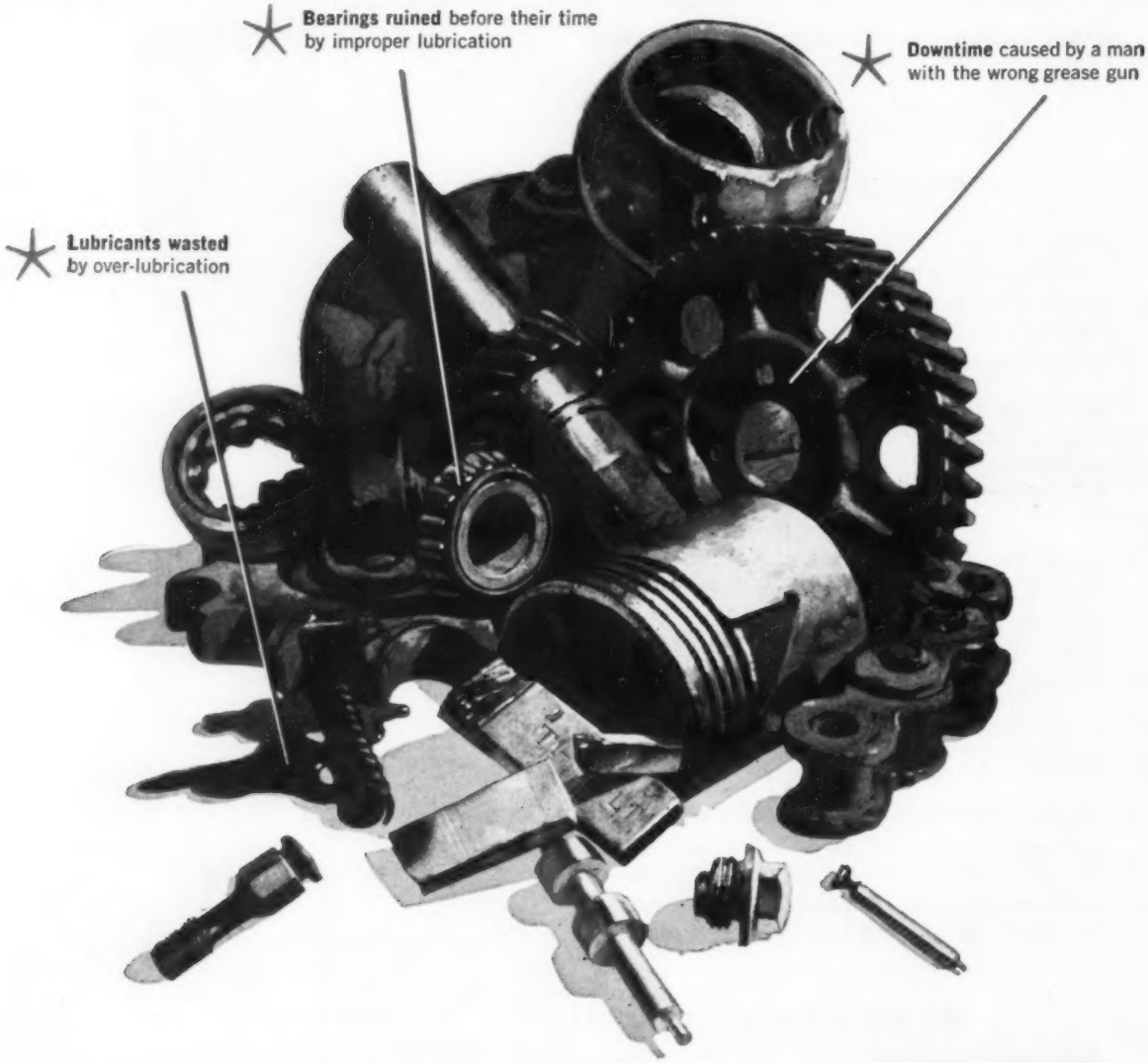
STANDARD CHEMICAL PRODUCTS INC.

HOBOKEN, N. J. • CHARLOTTE, N. C.

Specialists in textile oils, textile finishes, textile specialties for more than 35 years.

ANNOUNCING THE TEXACO "Stop Loss" Program

Created to starve a scrap pile at its source . . . and all it represents ★


★ Bearings ruined before their time by improper lubrication
★ Downtime caused by a man with the wrong grease gun
★ Lubricants wasted by over-lubrication

LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

Even though your mill is *already* an efficient operation, a Texaco "Stop Loss" Program can yield important savings in maintenance, production, purchasing and inventory.

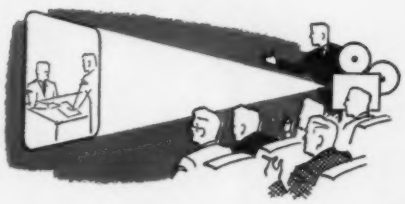
What it is; why it will work for you. The Texaco "Stop Loss" Program is a complete package specifically designed to modernize your lubrication practices–to keep pace with your updated production and marketing procedures. "Stop Loss" is based on our years of experience in organizing lubrication in industry.

If yours is an average mill, the adoption of this program will actually show up on your profit sheet. That's because the savings from "Stop Loss" go *directly* into net profits.

Lubrication, far from being an expense item, is actually one of your most effective cost control tools!

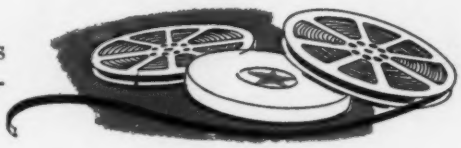
HERE'S WHAT YOU NEED TO HELP STARVE YOUR SCRAP PILE

These components of the Texaco "Stop Loss" Program are available to interested mill groups:



1. New 20-minute sound-color film "Stop Loss with Organized Lubrication"–created to show the many opportunities for cost control through organized lubrication practices.

2. A Lubrication Control System that takes the guesswork out of lubrication scheduling. It costs almost nothing to install, yet can save as much as 15% of your maintenance costs.



3. A film "package" for mill departments. This consists of educational films that cover the selection and application of greases, hydraulic oils, cutting oils, etc.

4. Co-ordinated booklets on the film subjects plus many others that can be used as guides in specific areas.

We believe that a modern Texaco "Stop Loss" Program will produce a package of economies in your mill.

MAKE YOUR RESERVATION TODAY
to see one of the year's most important management movies!

TEXACO
Throughout the United States
Canada • Latin America • West Africa

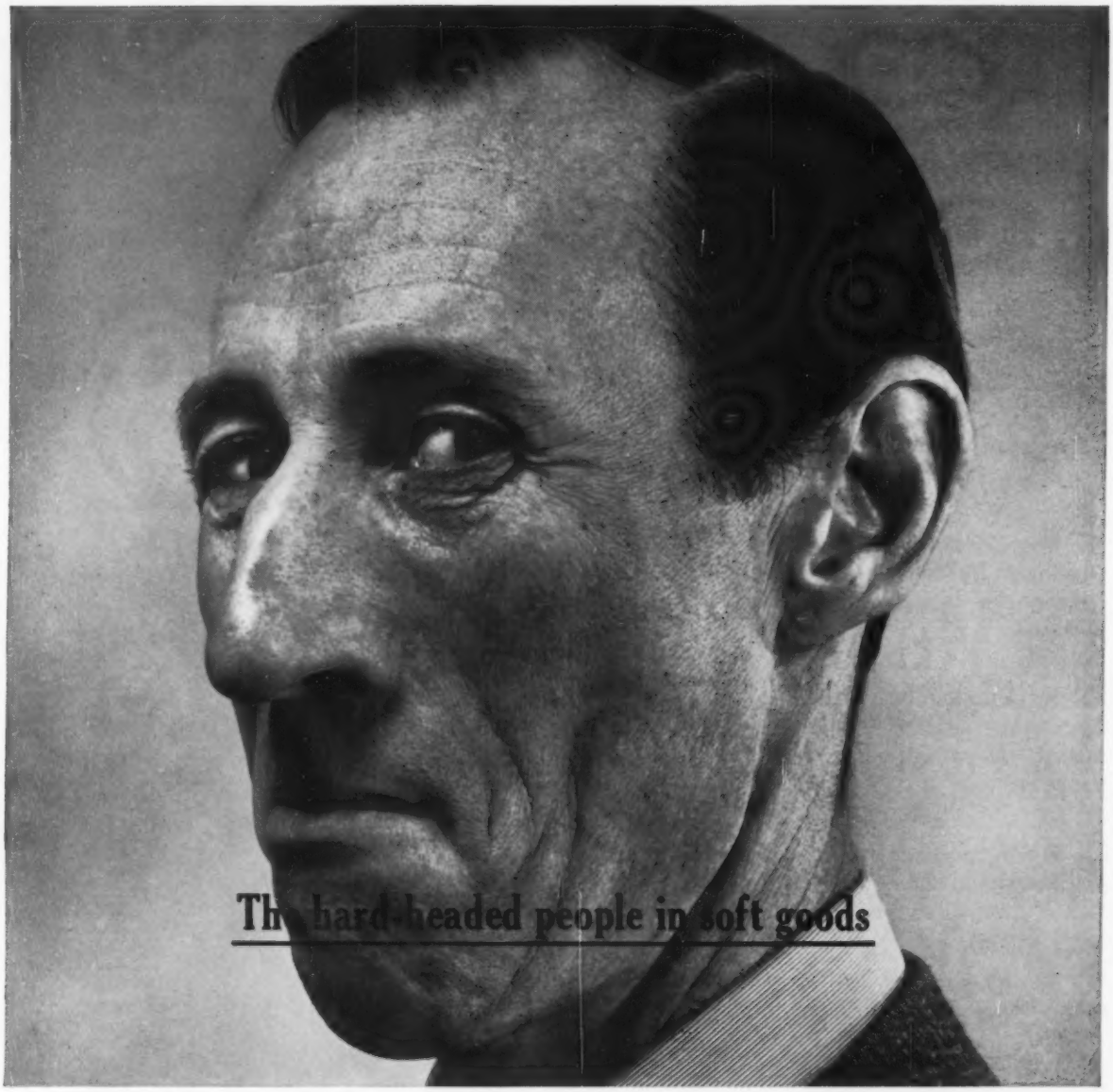
TEXACO INC., Dept. TI-21
135 East 42nd Street
New York 17, N. Y.

Please arrange a showing of "Stop Loss" at my mill.

Name_____

Title_____

(Please attach to your letterhead)



are featuring fabrics made with Courtaulds' new forms of rayon

It's true! Courtaulds' extraordinary rayon fibers are enriching knits and wovens all over the market. Good in themselves, they're also great mixers. They give a beautiful lift to polyesters and acrylics, for instance, and reduce fuzzing and clinging in wash-wear blends with all synthetics.

And what wonderful individual qualities! Cross-linked Corval and Topel produce superb quality of hand, have a flair for luxury weaves and a thirst for color that puts new glow and go into merchandise. Solution-dyed Coloray creates unmatched colorfastness and delicious, downy texture. All three fibers take to all finishes—make all kinds of fabrics—and make them *better*. Make sure you feature the better fabrics made with Coloray, Corval and Topel!

COLORAY®
SOLUTION-DYED RAYON

CORVAL®
CROSS-LINKED RAYON

TOPEL®
CROSS-LINKED RAYON

Courtaulds (Alabama) Inc., *first in man-made fibers, first in cross-linking, first in solution-dyeing*, 600 Fifth Avenue, New York 20...Greensboro, N. C. ...Le Moyne Plant, Mobile, Alabama.

IT WAS LIKE GRAND CENTRAL—BUT IT WAS FUN!

We never saw so many people around our Proctor equipment—prowling, poking, pacing, peering and praising.

Frankly, we loved it. And from the things you told us, you must have too.

Take the complete Proctor Textile Finishing Range, for example. (That's the one where you could climb up and see the whole floor of exhibits.) This Proctor system turned out to be a show-stopper. No need to tell you why. You saw for yourself.

Remember the live demonstrations? Remember the high production rates, operating efficiency, and the superb quality of finished products? Well, *every* Proctor unit will give you the same kind of results!

For you get more than just equipment from Proctor. You get the engineering experience, the manufacturing know-how, and the consulting assistance that work together to satisfy your most demanding requirements.

Contact your nearest Proctor Sales office and a Proctor Engineer will be glad to show you how this new equipment can better serve your needs.

Proctor

PROCTOR & SCHWARTZ, INC., 7th Street & Tabor Road, Philadelphia 20, Pa.

when you need

CAUSTIC *FAST*

. . . call

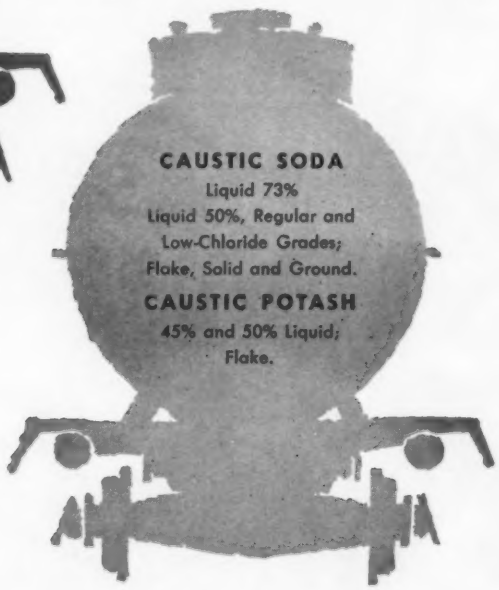
FMC® *FIRST!*

the time we save may be your own

With one of the biggest electrolytic caustic-chlorine plants in the industrial east . . . situated for fast access to railway mainlines, waterways and highways . . . we can give you superior service on both NaOH and KOH.

Since we frequently supply many customers faster than producers who are closer as the crow flies, we may be able to save as much time from order-to-delivery for you, too.

To find out, call us first the next time you need quick service on a spot shipment.



Putting Ideas to Work

FOOD MACHINERY AND CHEMICAL CORPORATION

Chlor-Alkali Division

General Sales Offices:

161 E. 42nd STREET, NEW YORK 17

it better be Golden Caprolan Nylon

It takes a tough tire yarn to stand the gruelling strain of raceway speeds—and tough is the word for high-tenacity Golden Caprolan® by Allied Chemical. But Golden Caprolan is more than just a tough yarn. It is a remarkably versatile yarn that offers a unique combination of superior performance qualities including unsurpassed resistance to abrasion, excellent rubber adhesion, greater resistance to flex fatigue, and troughing qualities not obtained from other yarns. Golden Caprolan established a new criterion for heat stability in nylon tire yarn and a new standard of strength for heavy-duty marine ropes. Golden Caprolan is performing superbly in conveyor belts, tarpaulin fabrics, high-strength industrial webbings, and other applications where heavy-duty performance is essential. If you have a tough job, we have the tough yarn for it. Our technical service, end-use development and fiber application staffs are ready to help.

GOLDEN caprolan NYLON OF THE 60's

Fiber Marketing Dept., 261 Madison Ave., New York 16, N. Y.

A BUFFALO RESIN-BONDED FIBER GLASS FAN MAY BE YOUR ECONOMICAL ANSWER

Excellent chemical resistance to a wide range of acids, salts, gases, organic materials and other corrosives — strength and resilience — ability to stand temperatures up to 300°F. with special resins — and light weight are some of the desirable characteristics of the 'Buffalo' Type FG Fan.

FLANGED INLET AND OUTLET—for gas-tight connections.

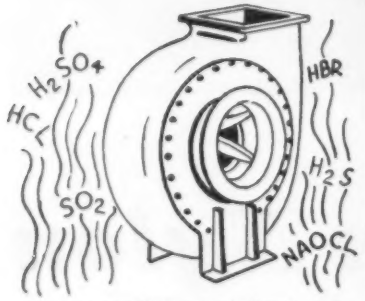
CAPACITIES — up to 34,000 cfm.

PRESSURES — up to 10″ static.

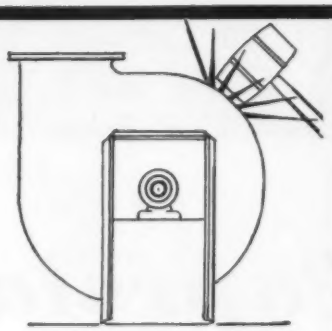
Fan Housing — resin-bonded fiber glass with stainless steel studs moulded-in for mounting to the bearing stand flange. Efficient scroll shape.

Rotor—husky steel wheel completely encased in resin-bonded fiber glass. Factory-balanced, statically and dynamically, for vibrationless performance.

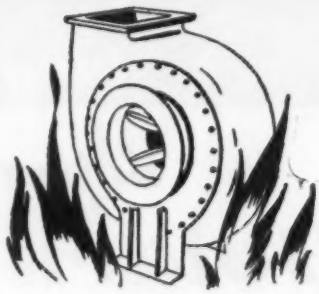
FUME-HANDLING PROBLEM?



corrosion-resistant



impact-resistant



won't support combustion

WRITE FOR BULLETIN FI-511 for all details and chemical resistance table.

"Buffalo"

BUFFALO FORGE COMPANY

Buffalo, New York

Buffalo air handling equipment to move, heat, cool, dehumidify and clean air and other gases.

Buffalo Machine Tools to drill, punch, shear, bend, slit, notch and cope for production or plant maintenance.

Buffalo Centrifugal Pumps to handle most liquids and slurries under a variety of conditions.

Sugar machinery to process sugar cane, coffee and rice. Special processing machinery for chemicals.

MULTIPLY ECONOMY by 5

When You Install Buffalo Pumps

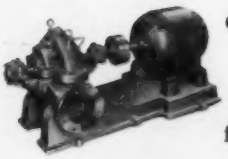
1 **Maximum parts interchangeability** reduces inventory costs.

2 **Emphasis on quality** insures extra years of economical, productive service.

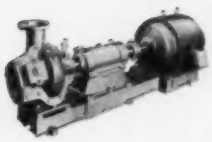
3 **Peak hydraulic efficiency** insures lower operating costs.

4 **Sturdy, extra-heavy construction** means trouble-free performance.

5 **Complete Buffalo line** gives one-source buying.

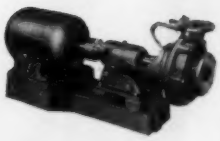


Clear Water Pumps. For peak efficiency in clear water service. Highest quality construction assures long, maintenance-free life. Write for Bulletin 955.

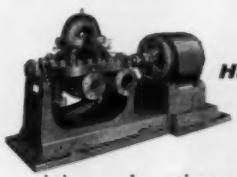


Non-Clogging Pumps. Efficiently move high consistency liquids. The diagonally split shell gives easy access for inspection. Rubber-lined models for moving abrasive or corrosive liquids. Send for Bulletin 953.

Heat Transfer Pumps. Specially designed to handle high temperature liquids. Construction includes required alloys, water-cooled bearings and packings suited to the job. High-efficiency single suction, solid shell design. Write for full information.



Chemical Liquid Pumps. These specially designed pumps stand up under the severest service, handle most types of corrosive or abrasive liquids. Choose from numerous models in exactly the trim you need. Send for Bulletin 976.



High Pressure Pumps. Designed for boiler feed and other clear water installations. These rugged pumps assure peak efficiency, minimum downtime and long life. Operate against heads to 1500 ft. Capacities to 900 gpm. For complete details request Bulletin 980.

Close-Coupled Pumps. Save space without sacrificing efficiency. Installation is simplified, no need for shaft alignment. Vertical or horizontal installation. Discharge adjustable to desired angle. Send for Bulletin 975.

Helping you select the pumps that will serve you best and most economically is your Buffalo Representative's job. Contact him today, or write us for complete facts.

"Buffalo" PUMPS

BUFFALO PUMPS DIVISION OF BUFFALO FORGE COMPANY

Buffalo, N. Y.

Buffalo air handling equipment to move, heat, cool, dehumidify and clean air and other gases.

Buffalo Machine Tools to drill, punch, shear, bend, slit, notch and cope for production or plant maintenance.

Buffalo Centrifugal Pumps to handle most liquids and slurries under a variety of conditions.

Squier machinery to process sugar cane, coffee and rice. Special processing machinery for chemicals.

T. B. Blackwell, Overseer of Spinning, Arcade Cotton Mill Division of Mount Vernon Mills, Rock Hill, South Carolina, discusses yarn quality with Armstrong representative Wayne Downs.

Minimize spinning problems, produce top-

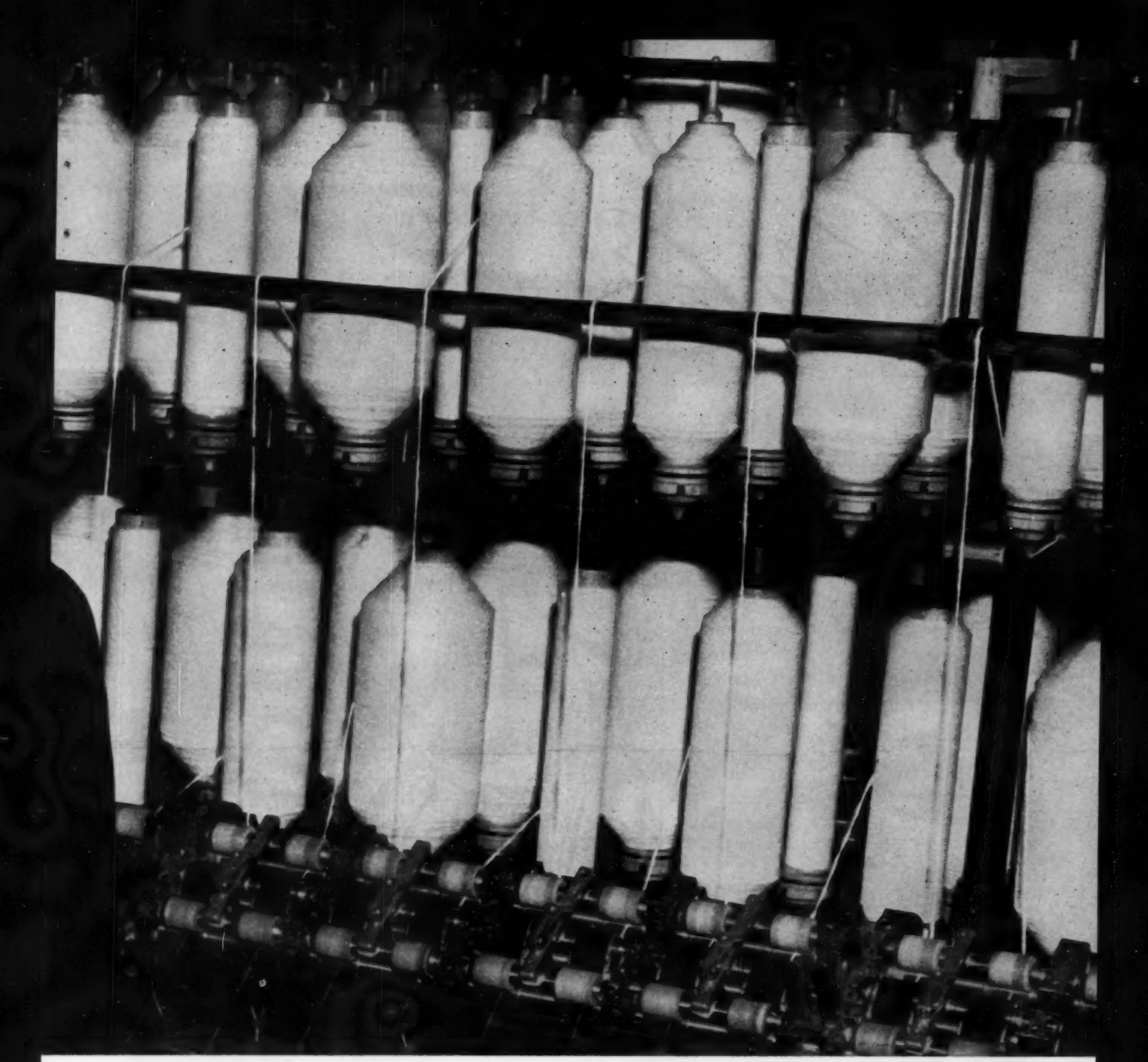
Modern high draft frames are designed to deliver maximum production of high-quality yarn. And the right spinning cots can help them do just that.

If front roll lap-ups . . . excessive eyebrowing . . . or yarn irregularities are reducing production or hurting yarn quality, a switch to Armstrong Accotex Cots may be the answer.

Accotex Cots are made of compounds that are especially engineered to combat these common spinning problems. New anti-static cots have cleared up stubborn front-roll lapping in many mills.

In other mills, Accotex NC-762, another anti-static material, has stopped serious eyebrowing on spinning and roving frames with flat clearers. In addition, many mills report substantial reduction in total waste where NC-762 Cots are used.

On some drafting systems, a softer cot compound often helps to reduce yarn irregularities and improve break



quality yarns with Armstrong Accotex Cots

strength. The Accotex line includes soft compounds for service on these frames.

Whatever your spinning problem, it's a good idea to talk things over with your Armstrong man. Chances are he can suggest an Accotex Cot that will meet your specific need. Call him, or write for more information to Armstrong Cork Company, Industrial Division, 6508 Ivy Street, Lancaster, Pennsylvania. Armstrong textile products are available throughout the world.

Armstrong

ACCOTEX COTS

1860-1960 Beginning our second century of progress

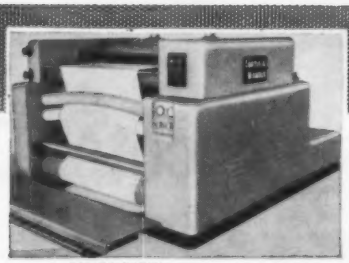
Lovely Lady —IN SOPHISTICATED FURS

She's suave, smooth and confident in a stylish fur fabric Orlon coat thanks to Curtis & Marble's High Pile Napper.

High style and quality fabrics are natural companions . . . and fine fabrics get the final touch of quality in cloth rooms equipped with modern, efficient Curtis & Marble finishing room equipment.

HIGH PILE NAPPER
For looped knitted goods used for linings and simulated fur fabrics

CM-125 BRUSHER



CM-125 SHEAR

CURTIS & MARBLE
72 CAMBRIDGE STREET • WORCESTER, MASS.

HEADQUARTERS FOR FINE CLOTH FINISHING MACHINERY SINCE 1831

Southern Sales & Service:
LAURENS ROAD • GREENVILLE, SOUTH CAROLINA

If It's
Made From

TURBO-
ORLON

It's Made
From the

No. 1
SWEATER
YARN

HERE'S WHY:

In the Turbo process fibers of famous DuPont Orlon* are s-t-r-e-t-c-h-e-d and b/r/o/k/e/n into variable lengths. Some fibers are then relaxed in a special steam process before blending with stretched but unrelaxed fibers . . . to produce a High Bulk yarn of superior loft and hand.

RESULT?

Yarn spun from Turbo-Orlon produces a variety of knitted garments

- **BULKY**
- **INTERLOCKED**
- **JERSEY**
- **FULL-FASHIONED**

with scientifically controlled shrinkage during final finishing. Whatever the characteristics required Turbo-Orlon can provide the answer.

LOHRKE / TURBO

1006

TURBO-ORLON

Contact a licensed Turbo mill . . . over 50 in United States and Canada

J. L. LOHRKE COMPANY / 3 PENN CENTER PLAZA • PHILADELPHIA 2, PA.

*DuPont trademark

"THE NEW CARRIER ROTASPRAY SYSTEM HAS REVOLUTIONIZED OUR TEXTILE AIR CONDITIONING"

HARRY BARBREY
Group Engineer, Woodside Mills
Greenville, S. C.

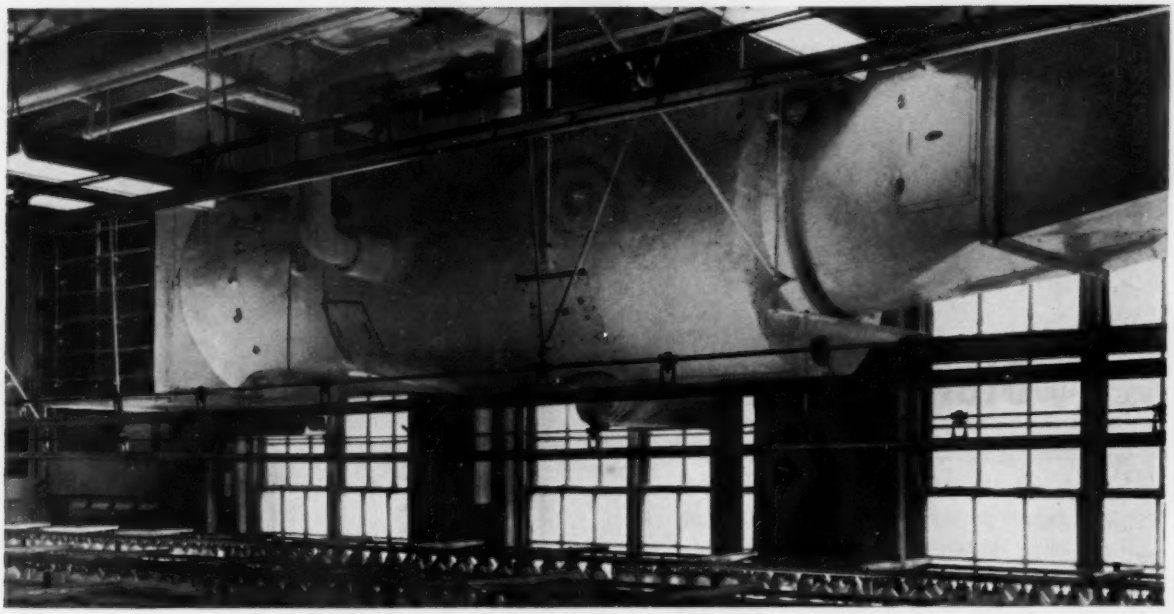
"In view of the highly competitive market in which textile manufacturers operate, we have always been alert to adopt modern methods and machinery that would decrease costs and improve the quality and output of our products," says Harry Barbrey. "A vital part of our long-range modernization program has involved replacements and additions to our extensive air conditioning systems. It was in this phase of our operation that we first investigated the Carrier Rotaspray Weathermaker System.

"This system, specifically designed for textile mills, requires no costly apparatus towers or equipment room construction. Rotaspray units operate with high-velocity air and therefore require only one-third of the space of conventional air treating apparatus of equal capacity. Since the units can be ceiling suspended, located on the roof or on an outside wall, valuable floor space is saved. These and other features made it possible for us to rapidly update our long-range plans with better air conditioning at lower initial cost.

"Now, with months of operating experience behind us at several plants, we find that we are obtaining more precise control with far less maintenance expense. Rotaspray Systems are now in operation at our Greenville, Easley and Simpsonville plants, and another is being installed at our Haynsworth plant in Anderson. In our opinion, the Rotaspray System has revolutionized our concept of textile air conditioning."

• • •

Woodside Mills is just one of many repeat customers now benefiting from this revolutionary new air conditioning concept. What savings can the Rotaspray System effect for you? That depends on the size and layout of your plant. For information, write Machinery and Systems Division, Carrier Corporation, Syracuse 1, New York.



Close-up of ceiling-suspended, stainless-steel Rotaspray unit, one of six serving over 54,000 sq. ft. of cotton-spinning floor area at Woodside. With a Rotaspray System, each department "dials" the temperature and humidity wanted.

ONLY CARRIER ROTASPRAY OFFERS THESE 7 MAJOR ADVANTAGES

1. Reduces cleaning and maintenance costs as much as 80% because units are self-cleaning, constructed of stainless steel and require no painting. For example, at Woodside Mills the cost of Rotaspray maintenance is only ¼ as much as previous systems.

2. Eliminates many system components —no water strainer, no water pump, no water tanks, no city water and drain piping, no apparatus room and no floor drains are needed at the units. These functions, including water treatment, are handled from a central point.

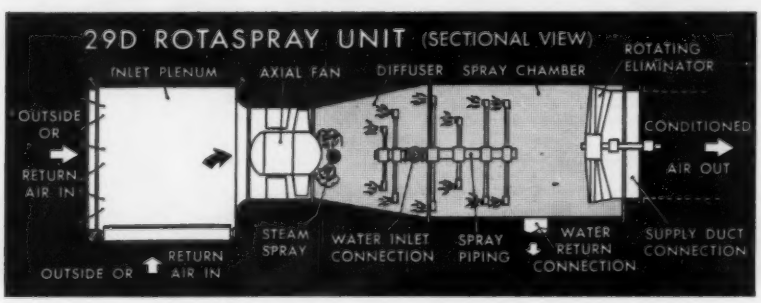
3. Needs no air filters—instead of trying to keep dirt and lint particles out as conventional systems do, Rotaspray draws them in, separates them from the air and returns them to a central point for automatic collection and disposal.

4. Improved temperature and humidity control eliminates dew point control and its problems. Within Rotaspray System capacity, departments simply "dial" the temperature and humidity required.

5. Constant air supply insures uniform temperature and humidity throughout the space at all seasons, yet with lower operating costs than conventional "volume-control" systems.

6. Eliminates "compromise" temperatures —maintains exact conditions everywhere. One area is not dependent on another.

7. Provides more at a competitive price —though individual plant conditions vary, on the average you pay no more for a Rotaspray System than for conventional good quality systems. And you get a lot more back in efficiency, economy of operation and maintenance savings.



Cycle of operation: A specially designed, vaneaxial fan discharges a controlled mixture of outside and return air into a spray chamber where finely divided spray water treats the air and cleans it of lint and other air-borne particles. An exclusive high-velocity rotating eliminator then removes all entrained water particles from the air stream before it passes through ductwork to the conditioned space.

BETTER AIR CONDITIONING FOR EVERYBODY EVERYWHERE

Carrier

Stainless Steel shows true colors in dyeing

Stainless Steel offers strong protection to this plant's dyeing process. Harsh agents don't bother the gleaming metal. High operating temperatures don't affect it. And Stainless Steel virtually never wears out, so equipment replacement costs go way down. That's why this company uses only Stainless Steel in their vats and dyeing machines.

This mark tells you a product is made of modern, dependable Steel.

The kiers and dye tanks previously used by this company chipped, peeled and corroded. Tiny flakes of corroded materials would get into the cotton yarn no matter how often the dyeing vessels were scoured. They switched to Stainless Steel and ended this corrosion problem. The Stainless Steel equipment requires practically no maintenance.

At this plant, they formerly sent their dye jobs out. But high costs and delays forced them to buy their own dyeing equipment. They chose Stainless Steel equipment. It washes sparkling clean—there's no color carry-over when batches are changed. Stainless Steel helps assure color fidelity.

Specify Stainless Steel equipment and repair parts for your plant. No other material can match the performance or product purity of USS Stainless Steel.

USS is a registered trademark

USS

United States Steel Corporation—Pittsburgh
American Steel & Wire—Cleveland
National Tube—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Supply—Steel Service Centers
United States Steel Export Company

United States Steel

Bemis Waterproof (laminated) Roll and Carpet Covers *

Give You Sturdy, Economical Protection

Bemis is also your top source for nearly all other types and sizes of packaging for the textile industry ... for example:

Burlap Tite-Fit Tubing *

Sturdy paper covers for textile rolls and carpets *

Merchandisable Flip-Close® and other fast-selling poly packages for soft goods *

Soft-finish cotton threads and twines; also burlap piece goods

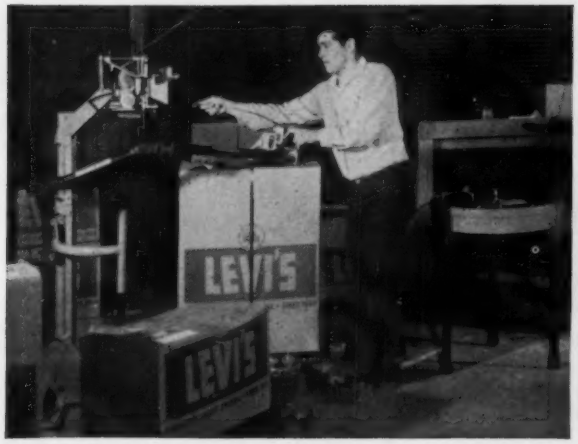
Ask for the complete story about the help Bemis can give you.

* Bemis developed these. It's natural we know how to make them better.

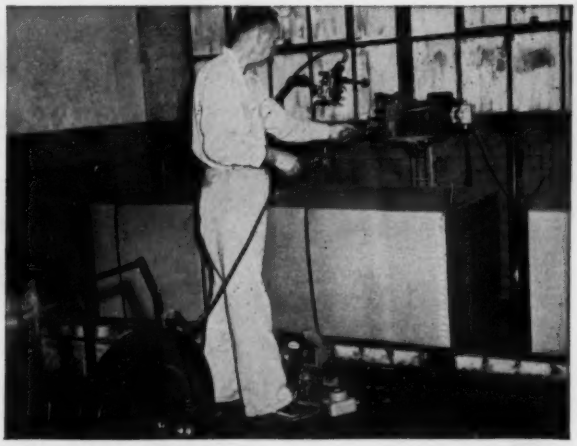
Bemis

Where flexible packaging ideas are born

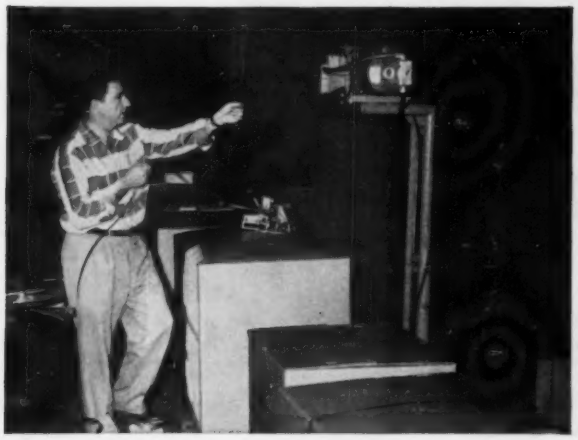
General Offices—111-R N. 4th St., St. Louis 2
Sales Offices in Principal Cities



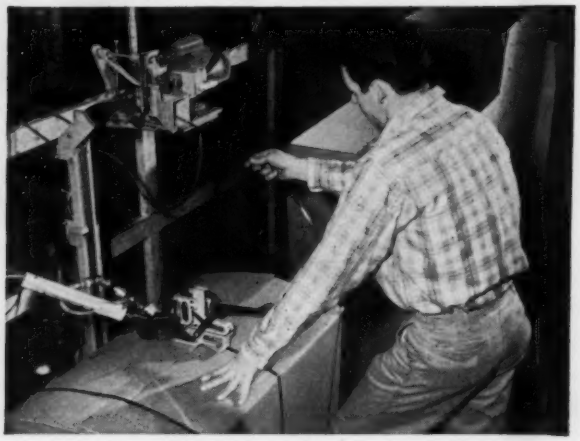
TROUSERS—One man works two conveyorized strapping stations...easily straps and weighs 440 cartons of various sizes per day, using Signode power strap feeders and Model A hand operated strapping tools. Production increased, and savings of 55% reported.



THREAD AND YARN—One man easily straps 300 cartons per day, four straps per carton, with a Signode power strap feeder and a Model AP air powered strapping tool. Operator has time for other duties. Two men were formerly assigned to carton strapping.



CHENILLES—One man straps 400 cartons per day. Cartons vary widely in size and weight. The operator has time for other duties, although two men formerly were needed. Signode power strap feeder and a Signode Model A tool are used.



FINISHED PRINT GOODS—One man straps 500 cartons a day, three straps per carton, using a Signode power strap feeder and a Model AP air powered strapping tool. Cartons vary greatly in size. Production has been more than doubled.

New low cost Signode power strap feeder a real money saver on textile packages

The power strap feeder is an independent, motorized, foot-pedal operated device for putting strap around big packages. It saves walking around...saves standing around...saves enough to pay for itself in short order. For more information, call the Signode man near you, or write to Signode for "Power Strap Feeder" folder.

SIGNODE

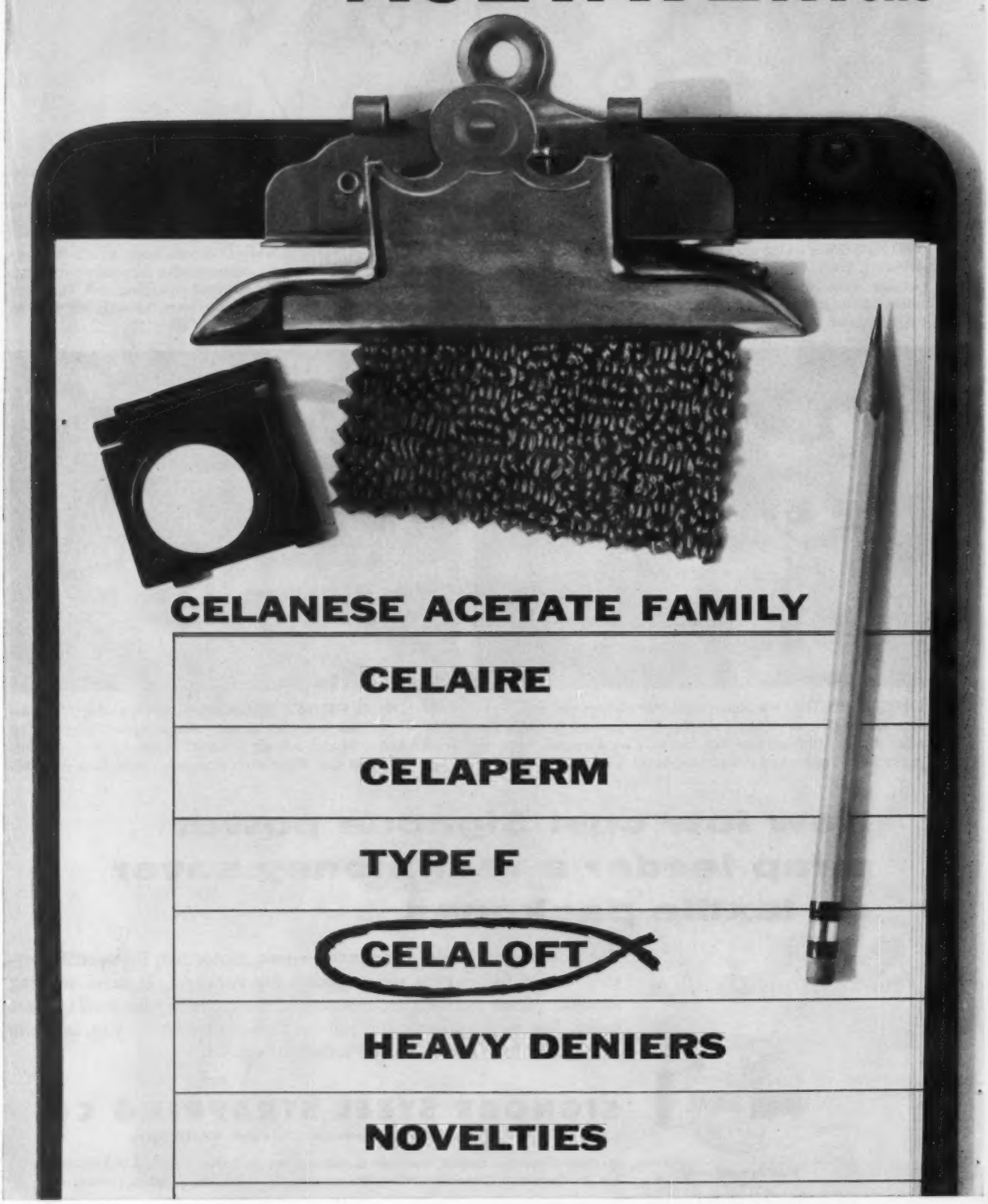
First in steel strapping

SIGNODE STEEL STRAPPING CO.

2664 N. Western Avenue, Chicago 47, Illinois

Offices Coast to Coast. Foreign Subsidiaries and Distributors World-Wide
In Canada: Canadian Steel Strapping Co., Ltd., Montreal • Toronto

ACETATE...one



CELANESE ACETATE FAMILY

CELAIRE

CELAPERM

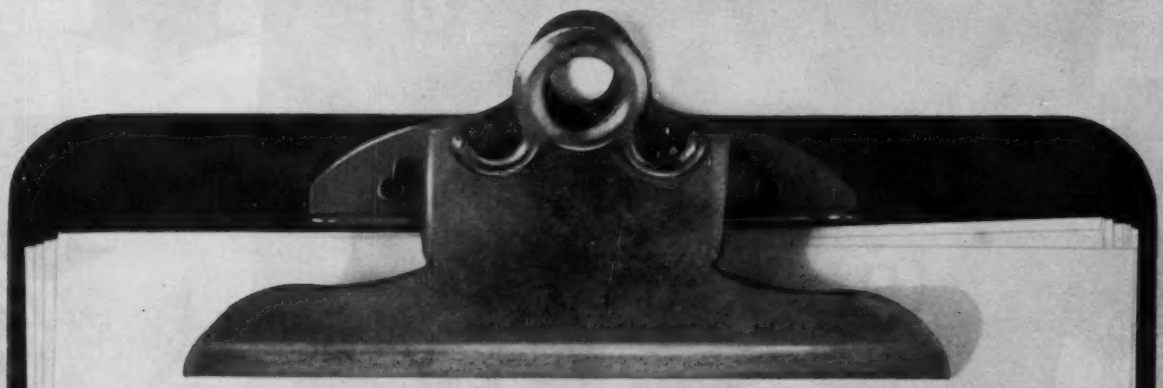
TYPE F

CELALOFT

HEAVY DENIERS

NOVELTIES

# of today's most versatile textile fibers



CELALOFT acetate is only one of the many examples of acetate which are specially engineered to provide you with the answers to specific needs in home furnishings and apparel fabrics. Celaloft is a bulked acetate and adds greater coverage, fullness of hand and the expensive fabric look that belies its actual price. Much more lavish textures are possible with Celaloft, as evidenced in many of the new loop pile upholstery fabrics.

Celaloft yarns are now available in dull and bright, and in Celaperm solution-dyed acetate colors as well. To take advantage of the potentialities of Celaloft, let Celanese work with you to develop new fabric constructions. Celanese Fibers Company, a division of Celanese Corporation of America, Box 1414, Charlotte 1, N. C.

Celanese® Celaire® Celaloft® Celaperm® Type F T.M.

Acetate... a Celanese contemporary fiber

DISTRICT SALES OFFICES: 180 Madison Avenue, New York 16, N. Y.; 15 N. Broadway, Des Plaines, Ill.; Western Merchandise Mart., Room 478, San Francisco, Calif; P. O. Box 1414, Charlotte 1, N. C.; 200 Boylston St., Chestnut Hill 67, Mass.; 3130 Maple Drive, N.E., Atlanta 5, Ga.

EXPORT SALES: Amcel Co., Inc., and Pan Amcel Co., Inc., 180 Madison Ave., New York 16.

IN CANADA: Chemcell Fibers Limited, 1600 Dorchester Street West, Montreal, Quebec.

Down with finishing costs— safely!

"AC" catalysts help you achieve finer results at lower cost—through longer resin bath life, faster more complete curing of thermosetting resins, with minimum resin add-on. And Monsanto AC Catalysts are compatible with practically all finishing agents. Write for complete technical data, and expert finishing counsel, to Monsanto Chemical Company, Plastics Division, Room 746, Springfield 2, Mass.

Monsanto

MONSANTO DEVELOPER IN **PLASTICS**

Other Monsanto textile chemicals: Resloom® E-63 chlorine resistant resin; Resloom E-50 cyclic urea resin; Resloom HP and M-75 melamine resins; Stymer® sizes; Lytron® polystyrene latices

Improve quality–

lower handling costs with... **EAGLE®**

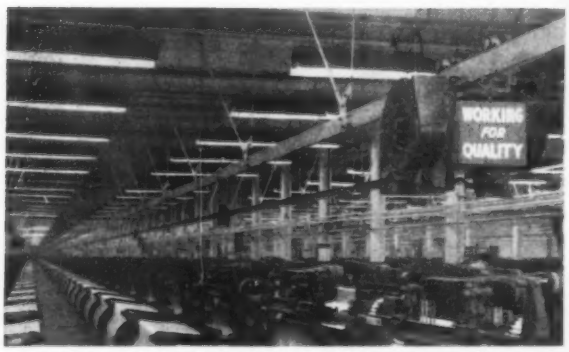
WRITE OR PHONE *Corn Products for expert technical assistance...*
helpful data on these fine products for the Textile Industry:
GLOBE® • EAGLE® • FOXHEAD® • TEN-O-FILM® and CLARO® starches • GLOBE® • EXCELLO® dextrines.

CORN PRODUCTS DIVISION CORN PRODUCTS SALES COMPANY • 9 East 55 Street, New York 22, N. Y.

Now...keep your work areas clean automatically, with specially designed Amco Cleaners!

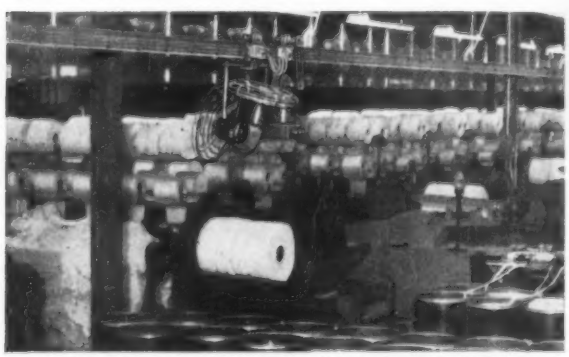
Amco has developed a wide selection of automatic cleaning equipment . . . designed to cut down manual cleaning, improve quality, and step up mill production.

For money-saving facts about Amco Cleaners, call American Moistening Company — an organization with more than 70 years' experience serving the textile field.

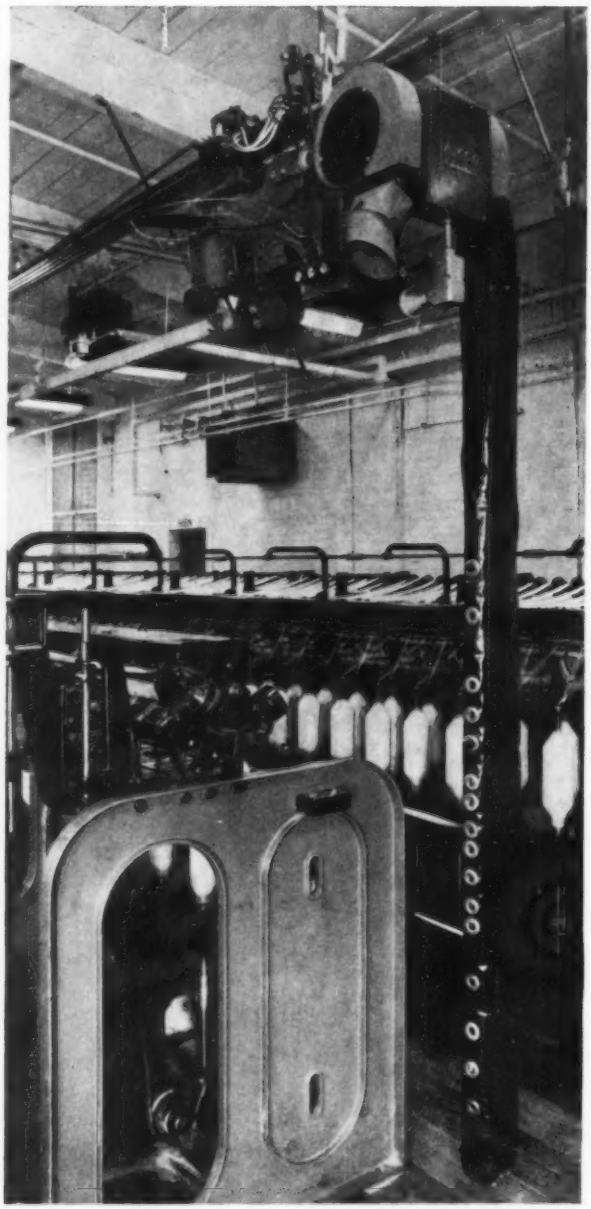


Helicone Loom Cleaners improve quality of fabrics by preventing waste accumulation on stop motions, drop wires, harnesses and reed caps.

Amco Loom Cleaners over Draper shuttleless looms. Sheeting is being woven at high relative humidity.



Amco Ceiling Cleaner provides automatic cleaning of ceiling, beams, walls and other surfaces. Excellent for card room areas.



Amco's electronically controlled Roving Frame and Ceiling Cleaner. Air delivery boot takes care of specific lint-collecting trouble spots.

AMCO

SINCE 1888

Air Conditioning Equipment — Textile Specialties

American Moistening Company, Cleveland, North Carolina

Branches: Atlanta, Ga., Providence, R. I., Toronto, Ont.

SACO-LOWELL

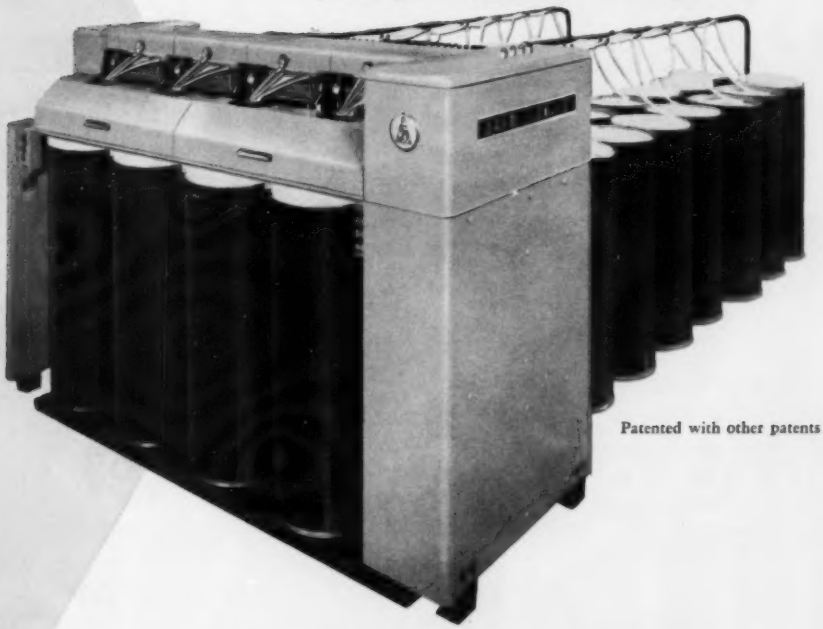
versa-matic

DRAWING

Delivery speeds to 600 ft per minute

18"X42" delivery cans

Highest production by every standard — per delivery, per man hour, per square foot of floor space.



Patented with other patents pending.

New VERSA-MATIC Drawing opens a new era in drawing production. *Pneumatic clearers* and 18" dia. x 42" high delivery cans give maximum efficiency rates.

VERSA-MATIC is completely automatic except for creeling the stock and doffing the cans. Outstanding features include the use of anti-friction bearings throughout; fine change gears which permit minute changes in sliver weight and complete precision gearing 100% tested and inspected before installation. For highest efficiency plus maximum production of uniform sliver VERSA-MATIC belongs in your mill.

THE STANDARD OF QUALITY AND PERFORMANCE Since 1813

Saco-Lowell Textile Machinery Division

SACO-LOWELL SHOPS

Executive and Sales Offices: EASLEY, SOUTH CAROLINA

Branch Sales Offices: ATLANTA, GA., CHARLOTTE & GREENSBORO, N. C., GREENVILLE, S. C., SACO, ME.

The reason is performance . . . not promise. All the way down the line from spinning to weaving to cutters to consumers Creslan is growing in popularity . . . moving steadily into well known lines of quality merchandise. There's good news for you, too, in Creslan. Learn about its many important advantages. Send for our TECHNICAL DATA BULLETIN. Creslan acrylic fiber is a product of American Cyanamid Company, Fibers Division, New York. CYANAMID

Offices: 111 West 40th Street, New York; 3333 Wilkinson Blvd., Charlotte, N. C.; 2300 South Eastern Avenue, Los Angeles, Cal.; 40 Fountain Street, Providence, R. I.

FIND OUT WHY MORE & MORE MILLS ARE USING

Creslan®

ACRYLIC FIBER

THE NEWEST OF THE ACRYLICS

NEW...

with capacities to 50 hp!

LINK-BELT

RS P.I.V.

VARIABLE SPEED DRIVES

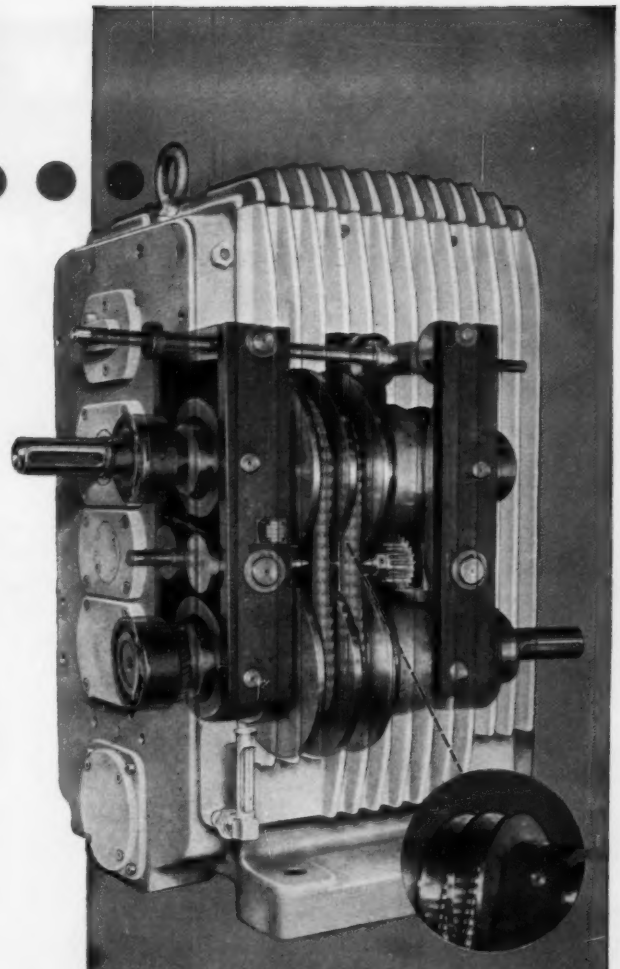
All-metal drives use single-roll chains to achieve positive, stepless, infinitely variable speed control

With a unique chain design and force lever system, Link-Belt RS P.I.V. drives represent a major advance in direct-drive variable-speed transmission. It's the most compact mechanical 50 horsepower variable speed drive on the market.

Twin strands of high-load capacity chain operating between opposing conical wheels permit extreme compactness. The effective diameters of the wheel faces are altered during operation, changing their ratio and the output shaft speed accordingly . . . providing smooth, positive, accurate speed adjustment between maximum and minimum settings. Constant hp or torque is maintained over the complete speed range.

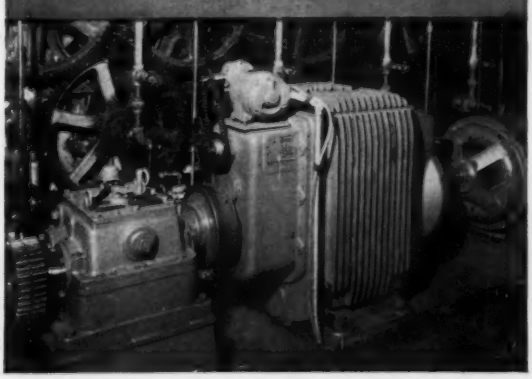
Link-Belt RS P.I.V. drives are all-metal and pressure-lubricated. Capacities to 50 hp, with speed variation ratios up to 5.5:1. For full details, contact your nearest Link-Belt office or authorized stock-carrying distributor. Ask for new Catalog 2874.

13,300



RS-33 P.I.V. with twin chain arrangement for capacities to 50 hp. Inset shows close-up of unique all metal single roll chain construction.

47-ROLL PAPER-MAKING MACHINE uses Link-Belt RS P.I.V. on primary drive. The RS P.I.V. powers a two-speed gear drive which enables paper speeds to be varied over two ranges . . . 4 to 16 yards per minute and 12½ to 50 yards per minute.



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TYPE	CROSS-SECTION OF FIBER	PROPERTIES	END USES
REGULAR RAYON		Truly the basic fiber of the rayon industry, it gives fabric soft hand and luster. Can be used alone or in blends. Its high moisture absorption makes it ideal for blending with the synthetics.	Uses for regular rayon are legion. It is by all odds the most popular fiber of the apparel industry.
CRIMP		This rayon is modified chemically to produce a permanent crimp which creates a lofty, wool-like hand in fabrics.	Tufted products and brushed fabrics. Also widespread uses in upholstery, apparel, automotive and nonwoven fabrics.
SMOOTH (SUPER L*)		A smooth, long-wearing, soil-resistant carpet fiber, easily blended with wool, nylon or acrylics. Easily cleaned.	Super L is specifically a carpet fiber used in both looped and cut pile fabrics, tufted or woven.
V-22 INTERMEDIATE STRENGTH		Similar to regular rayon staple in nearly every respect, except that it is stronger.	Industrial fabrics and sheer apparel fabrics.
XL (AVRON*)		Very high strength. Adaptable to many finishes. Stronger after wash and wear treatment than cotton. In fabrics, XL has a soft, luxurious hand and an even appearance.	The strength of XL is such that it is the choice of the rayons for industrial uses such as belting. In addition it has broad application in apparel, drapery, upholstery and other home furnishings fabrics.
FIBER 40 (AVRIL*)		A permanently stable rayon fiber, similar to cotton in strength and elongation. Can be mercerized and Sanforized.	Knit or woven fabrics where stability is a requirement. Ideal in drapery warps. Wide application in apparel fabrics, either 100% or in blends.

TYPE	CROSS-SECTION OF FIBER	PROPERTIES	END USES
RD-100 (AVLIN*)		Creates a firm linen-like hand, due to its ability to interweave tightly with itself or other fibers. Shows unusually high luster.	Apparel fabrics, in blends with synthetic and natural fibers.
RD-101		A rayon staple fiber with exceptional self-bonding characteristics.	Various specialty papers and nonwoven fabrics.
SHORT CUT		This is essentially a mechanical development to produce fibers of ½" or less in length —using any of the Avisco fibers.	Used principally in specialty paper and nonwoven fabrics, and in reinforcing foams and rubber.
COLORSPUN®		Colorspun is a solution-dyed fiber noted for its colorfastness and brilliance of colors. Colorspun fibers can be blended to produce at a low cost a wide range of colors from a small selected group of basic colors.	Used in wide variety of apparel and home furnishing applications, particularly draperies, upholstery and carpets.
MEDICAL STAPLES		The uniformity, cleanliness and absorbency of these rayons plus their high whiteness commend these fibers to the medical profession.	Absorbent balls, bandages, padding sponges, surgical dressings, wipers, gauze, masks, personal products.

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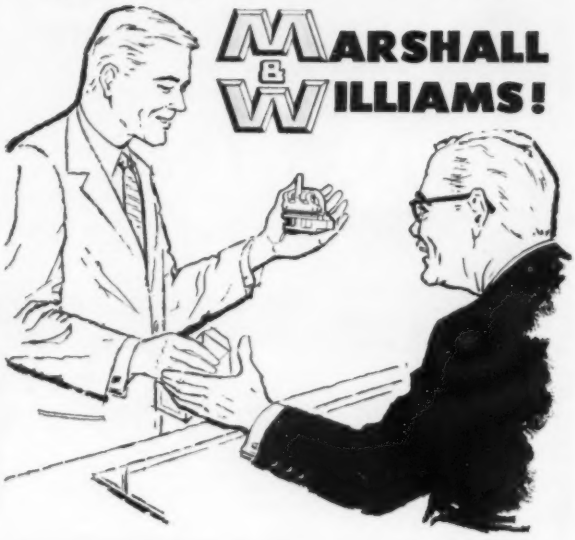

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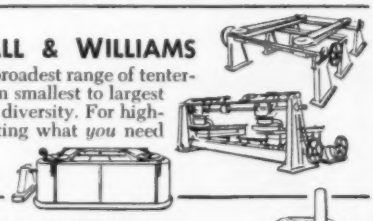

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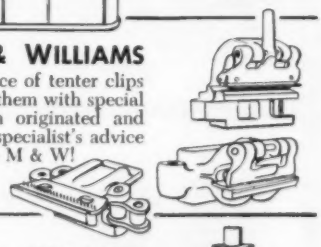
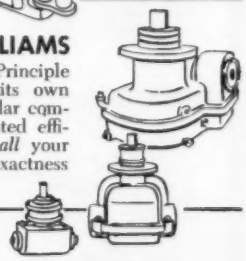


Only MARSHALL & WILLIAMS can offer the M & W Modular Principle in tenter frames — combining its own drives, frames and clips as modular components to give you unprecedented efficiency and economy. To meet *all* your processing needs with scientific exactness . . . ask M & W!



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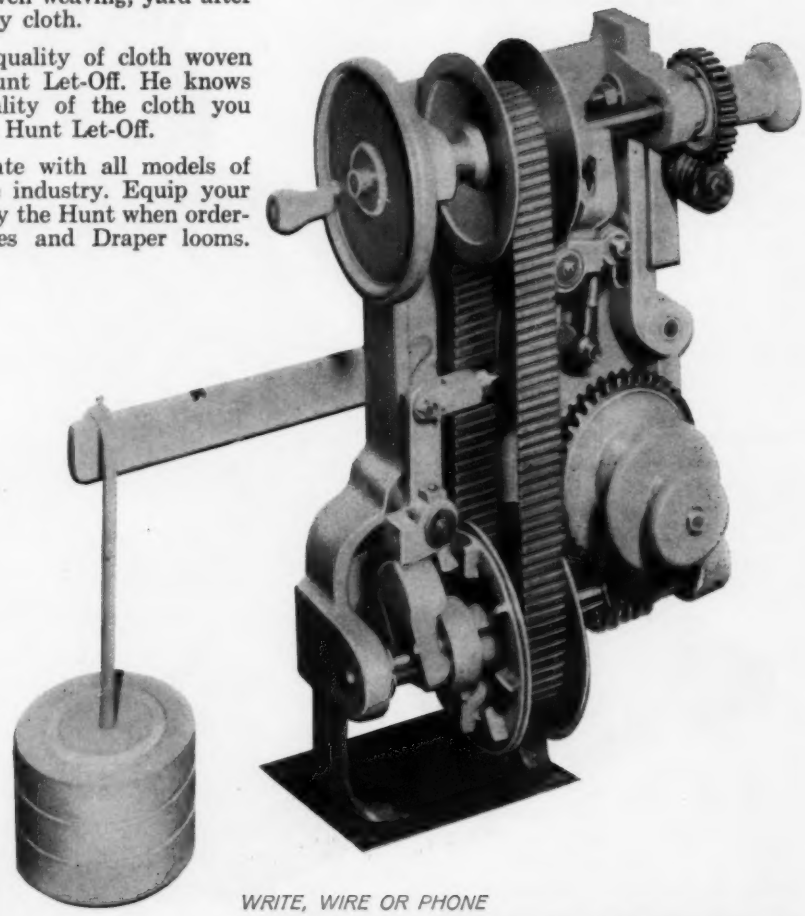

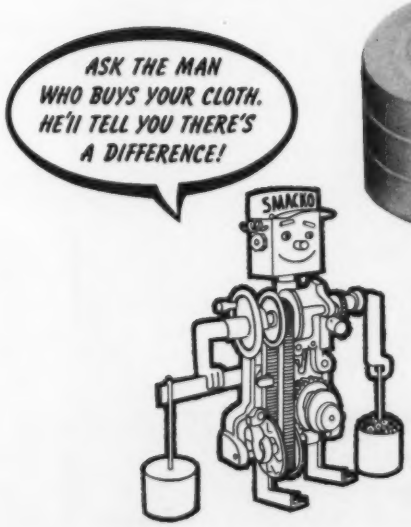

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NEWS IN BRIEF

Council "Aghast" Over Import Refusal. The National Cotton Council, through its president, J. Craig Smith, said it was "aghast and bitterly disappointed" at the refusal of the Tariff Commission

to limit imports of cotton textiles. "This action of the majority of the Commission closes the door on administrative relief. The industry, therefore, is now forced to appeal directly to Congress," Mr. Smith said.

Textiles on Psychiatrist's Couch. Here is a ten-point program for improving the psychological climate in which textiles are produced and sold, offered by motivational researcher Ernest Dichter at

the recent London conference of the Textile Institute: 1. Create a personal relationship between textiles and consumers. 2. Create meaningful emotional associations for textiles. 3. Resolve the consumer's misery of choice in purchasing textiles by explaining frankly what a fabric can and can not do. 4. Make buying an exciting experience. 5. Provide moral permission for buying textiles. 6. Appeal to varying consumer personality types. 7. Educate children to know and understand fabrics. 8. Keep pace with changing tastes. 9. Fill new and unsatisfied needs. 10. Make news as an industry, by relating textiles to the dynamics of life.

AATCC Emphasizes Newness. "New Fibers—New Blends—New Fabrics" will be the theme of the annual convention of the American Association of Textile Chemists and Colorists, to be held at Philadelphia's Hotel Sheraton, October 6-8. Attendance of 1,500 is expected, with about 75 exhibitors participating.

New Gin Moisture Meter. Development of an electronic instrument for continuous measurement of the moisture content of cotton fibers is reported by the USDA's Southeastern Cotton Ginning Research Laboratory at Clemson, S. C. The instrument, based on electrical resistance principles, is in-

Labor-Management News

Textiles No Santa Claus, TWUA Told. The burden of imports should be shared equally by all affected industries; the textile industry is no Santa Claus, Sen. John O. Pastore (D., R.I.) told the recent biennial convention of the Textile Workers Union of America.

The Arbitration Story. The Bureau of National Affairs, Inc., has published a revised edition of its standard work in the field of labor arbitration, "How Arbitration Works." First published in 1952, the book has been completely revised and enlarged to keep pace with the increased scope of arbitration in labor-management relations. The 510-page book is available at $9.65 from BNA at 1231 24th St., N.W., Washington 7, D. C.

TWUA Asks New Cabinet Post. At its recent convention, Textile Workers Union of America called for a "stronger voice for consumers" in government affairs, and passed a resolution proposing establishment of a new department in the President's Cabinet, the "Department of Consumers."

Briefs. Textile Workers Union of America has been certified as bargaining agent for the 45 employees of Trenton (Ont.) Dyeing & Finishing Co. * * * The 150 workers at Vernon Textile Co., Philadelphia, Pa., have received a 7-cent across-the-board raise after a two-day strike. * * * A contract has been signed by TWUA and Stauffer-Dobbie, Ltd., Galt, Ont., 37 months after the union was first certified as bargaining agent for the mill's 350 employees. * * * Wage increases and certain fringe benefits have been gained by 430 TWUA members in the Los Angeles area in new contracts. Included were 250 employees at Allen Industries, Inc., Compton, Calif.; 110 workers at California Hand Prints, Hermosa Beach, Calif.; and the 70 union members at Sierra Ambassador Co., Los Angeles.

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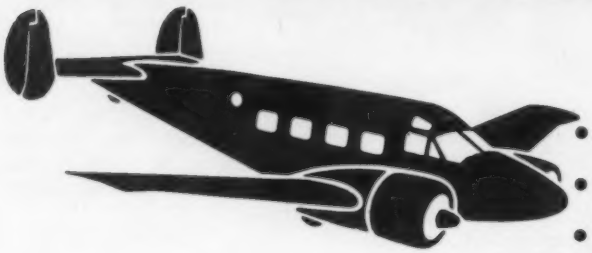

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tended to enable ginners to use dryers without overdrying the lint. USDA's researchers now look to the use of the instrument to actuate controls for automatic regulation of the drying process.

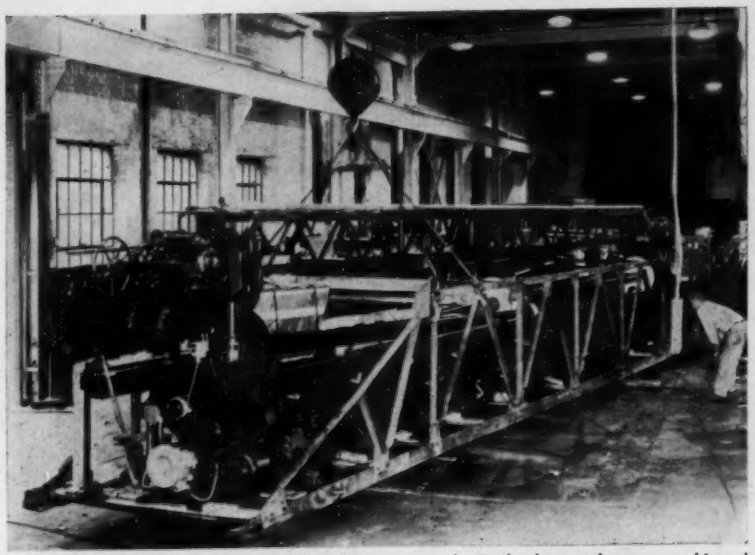
Little Fudging on Labeling Law. Compliance with the requirements of the Textile Fiber Products Identification Act has so far been better than that experienced at the same stage with any other labeling law, according to Harvey Hannah, chief of the Fair Trade Commission's Division of Textiles and Furs. The law became effective March 3.

Canadian Textile Seminar. The Seventh Canadian Textile Seminar will be held at Queen's University, Kingston, Ont., September 7-8, 1960. The biennial affair (not to be confused with the Canadian Textile Conference scheduled for Montreal's Queen Elizabeth Hotel next February 7-9) is expected to attract 500 registrants from the Canadian and U. S. textile industries.

Blanket Indictment. Inclusion of wool blankets, knit items, and other textiles on the U. S. bargaining list for possible tariff concessions "constitutes government harassment" of the American industry, according to Hugh G. Chatham, president of Chatham Mfg. Co. and blanket group director of

the National Association of Wool Manufacturers. "The statement of a high government official that textile items on the list are those which have not faced severe import competition again indicates that the government seems determined to deliver the U. S. market piece by piece—in this case, blanket by blanket—to our foreign competitors," he said.

Testing for Dyestuff Tinctorial Strength. Sandoz, Ltd., recently disclosed a new test method for



This papermaker's felt loom, 500 inches between swords, is the largest loom ever shipped in the erected state. The Type F-2 3 X 3 box loom has 26 harnesses, measures 50 feet wide by 8 feet deep by 8 feet high, and weighs about 20 tons. It was shipped from the Crompton & Knowles Corp. plant in Worcester, Mass., to Appleton Woolen Mills, Appleton, Wis., by trailer truck, making the 1,136-mile trip in six days.

determining the tinctorial strength of dyestuff. The new formula is based on the measurement of tristimulous values of dyeing and is said to be useful in cases where dyestuff absorption spectra in solution are not identical. In addition to determining total color difference, claim is made that the new technique measures differences in hue, saturation, and value between dyeings of equal tinctorial strength.

Another Country Heard From. Sixty thousand knitted sports shirts from Jamaica are now on sale in the U. S. market, according to a report from the Jamaica Industrial Development Corp. The shirts were made by American-owned Jamaica Textile Industries Ltd., a firm established under Jamaica's Export Industry Encour-

agement Law, which permits duty-free entry into Jamaica of equipment and raw materials, and freedom from income taxes for seven years.

Women's Fiber Preferences. The U. S. Department of Agriculture has published results of a survey of fiber preferences in clothing of 2,310 women between the ages of 18 and 65. Cotton was the most

popular for blouses, summer dresses, and summer skirts; nylon was the leader for slips; and wool topped the list for knit dresses. No one fiber was dominant choice for rainwear, summer suits, or between-season dresses. Copies of the complete report, "Selected Data on Women's Attitudes Toward Cotton and Other Fibers in Clothing," AMS-378, may be obtained without charge from Marketing Information Division, Agricultural Marketing Service, U. S. Department of Agriculture, Washington 25, D. C.

Abrasion of Nylon Filaments. A novel method for determining the abrasion characteristics of nylon yarn, reported in a foreign publication, involves passing the yarn at a predetermined angle, tension, and velocity over the edge of a

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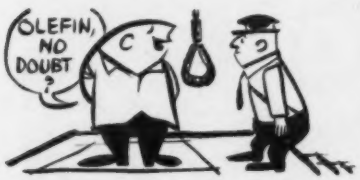
thin silver plate. Abrasion effects are measured by loss in weight of the silver.

Waterproofing Research Report. A comprehensive report on research to improve the water resistance of cotton fabrics has been published by the U. S. Department of Agriculture. Five papers dis-

cuss several avenues of approach: utilization of the greater swelling capacity of immature cotton fibers, treatment of yarns before weaving, weaving unusually dense fabrics, and studying the effect of each successive step in fabric finishing on air and water resistance. Single copies are available without charge from Southern Utilization Research and Development Division, P. O. Box 19687, New Orleans 19, La.

Olefin Rope Catches On. Between 750,000 and 800,000 pounds of polypropylene rope were produced last year—first full year of production—according to Dawbarn Brothers, Inc. This compares with



3,800,000 pounds of nylon and 500,000 pounds of Dacron. Because of its 0.90 specific gravity, compared with 1.14 for nylon and 1.38 for Dacron, the production of polypropylene rope represented a correspondingly higher footage.

Narrow Fabrics Standards Needed. "It is regrettable that the narrow fabrics industry does not have an up-to-date, scientifically prepared set of standards for the accurate testing, measuring, and examination of all narrow fabrics," says a representative of Lea & Sachs, Inc., Chicago selling agent for narrow fabrics. The firm has developed such standards for the mills which it represents, and comments, "Wouldn't it be nice for the buyer [of narrow fabrics] if all suppliers measured with the same ruler."

Ask Restriction on "Waterproof." A bill has been introduced in the House of Representatives by Rep. Wilbur Mills (D., Ark.) to limit the use of the term "waterproof" in tariff matters to fabrics used to make rainwear, protective sheeting, dress shields, umbrellas, and similar items. Water-repellent fabrics would not be classified as waterproof unless generally used to make these articles.

Management Seminars at PTI. Seminars dealing with company operations, business relations, and management methods will be offered on a year-round basis at the new Advance Management center sponsored by Philadelphia Textile Institute in cooperation with Harry J. Woehr and Associates. The first of the seminars was held last month, and a series of summer seminars continues into August.

Watch Fake Orders — TTMA. Tufted Textile Manufacturers Association has warned its members to be wary of a purported buyer for a prominent Canadian department store, who phones offering to place orders if the mill will prepay freight and duty. A TTMA member who checked with the Canadian store was told that the caller was already well known to authorities on both sides of the border, and had no connection with any legitimate Canadian enterprise.

Japanese Take Sweater Market. A survey conducted by the National Knitted Outerwear Association shows that imports of full-fashioned sweaters from Japan equalled 31 per cent of U. S. production in 1957, 38 per cent in 1958, and 39 per cent in 1959.

Textile Machinery Exports. Representatives of American textile machinery manufacturers, meeting recently with U. S. Department of Commerce officials, outlined the problems they face in selling to foreign mills. The machinery representatives reported that they now have an export market of about $75 million annually, or about 25 per cent by value of their total production. However, volume is now only about 25 to 50 per cent that of 10 years ago, and employment has dropped 30 per cent in that period. Chief problems are tariffs and other barriers; and price differentials, because of labor and other costs. The industry representatives urged legislation providing for accelerated depreciation; and encouragement of more liberal credit insurance by private banks for foreign sales, to supplement the Export-Import Bank program.

Fine-Count Cashmere Spinning. Development of a method for spinning cashmere in counts as fine as 15 run is announced by H. P. Chandler, Inc., Lowell, Mass. The yarns spun by the method are called "Chanspun."

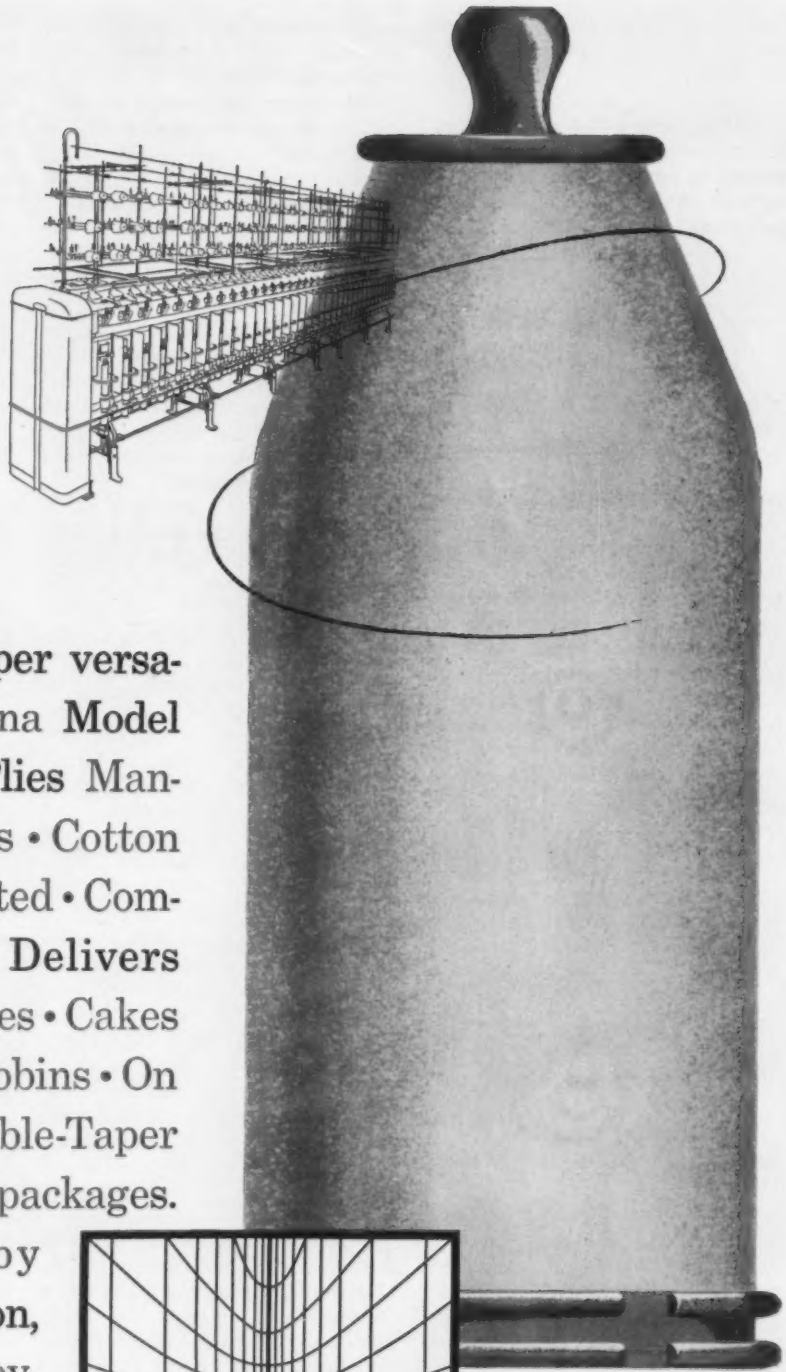
Merchandising Notes

Man-Made Fiber Producers Association, Inc., have produced a television show titled "Man-Made Fibers," now being shown by TV stations across the country. The program features the scientific development and consumer acceptance of cellulosic and noncellulosic fibers, and stresses the important part basic research plays in the engineering of the man-made fibers to meet requirements of specific end-uses.

The Denim Council has announced that "Denim Days" this year will be August 15 through September 17. Formerly called "Denim Week," the promotion now lasts for thirty selling days rather than six.

Northwestern University's Steuart H. Britt lists these merchandising developments which can be expected in the near future: rapid increase in automatic vending, increased use of credit and installment buying, greater emphasis on package design to achieve product individuality, self-service outlets moving more than half the total goods sold (within ten years), and expanded marketing services by

Continued on page 149



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RECENT TECHNICAL AND COMMERCIAL DEVELOPMENTS

by J. B. Goldberg
Consultant to the Textile and Allied Industries

Exclusive

FABRICS AND FINISHES

Aluminum Impregnated Fabric. A manufacturer of plushes and pile fabrics has reported the development of a process for impregnating materials with aluminum. It is claimed that this new technique permits retention of original fabric strength, texture, design, and flexibility, while imparting heat resistance up to 2,500 F. The finish can be applied to one or both sides in aluminium or other colors. Range of application anticipated includes space suits, industrial safety gloves and aprons, outdoor cooking safety apparel, and fire-resistant draperies.

Diaper Fabric. A Canadian invention to provide ease-of-care is a diaper lining made of knitted Arnel triacetate. The lining is said to act as a filter, keeping the skin dry while wetness is absorbed in the regular outer diaper. Featured are ease of washability, non-allergenic properties, and durable softness and whiteness.

MACHINERY AND PROCESSES

Raschel Rug Machine. The German Karl Mayer Co. plans to make available in the U. S. a two-needle carpet-knitting raschel machine operating at 200 courses per minute in 8 gauge. Creels are eliminated by the use of warp beams arranged in a separate frame behind the machine. Pile height is adjustable from 1/5″ to 1/2″ and high and low pile effects can be combined in one fabric. There is no provision for patterning except through use of multicolored warps for stripe designs.

Ultrasonic Dyeing. Methods and equipment for ultrasonic dyeing of textiles have been assigned in a U. S. Patent application to B. M. Harrison Electrosonics, Inc. According to Harrison, the method employs ultrasonics to achieve a negative pressure to release entrapped gases from the material being dyed. Each peak of negative pressure is closely followed by a high degree of positive pressure which forces the dyestuffs into the interstices vacated by the gases. Used in combination with temperatures 20 to 30 degrees below the boil, and electronic means for controlling the concentration of the dyes, the system can produce a uniformity of color tone and saturation difficult to achieve by normal means, it is claimed.

Continuous Rotary Press. An English concern is producing a new continuous rotary press with automatic operation. The machine, only 10 feet in length, can handle a wide variety of fabrics. Accurate controls enable ready reproduction of identical finishes on different lots, and various types or weights of cloth can be subjected to exactly the same pressure with only one setting.

Combined Spinning and Winding. An Alabama inventor has designed a prototype unit which is claimed to be capable of drafts of from 6 to 100, taking roving through a double apron drafting system, through a flyer, and upward to a take-up. It is expected that eventually the system may start with card sliver. The new device overcomes the disadvantage of the ring and traveler method of present spinning systems which limits package size, utilizing a lightweight flyer with nothing turning except the flyer and the ballooning yarn. Further improvements are planned to permit accomodation of drawing sliver, condensed balloon, increased production and package size.

Improved Dyeing of Polyester Textile Materials. Recently patented by a Virginia concern is a method of improving the dyeability and minimizing pilling in polyester fabrics. The treatment comprises immersion in an anhydrous, high-boiling, water-soluble, inert organic liquid medium in the absence of dyestuff and at temperatures of at least 250 F, but below the softening point of the material. Subsequent processing includes immediate contact with relatively cool water, leaving small residual amounts of the organic liquid medium entrapped within the fiber structure.

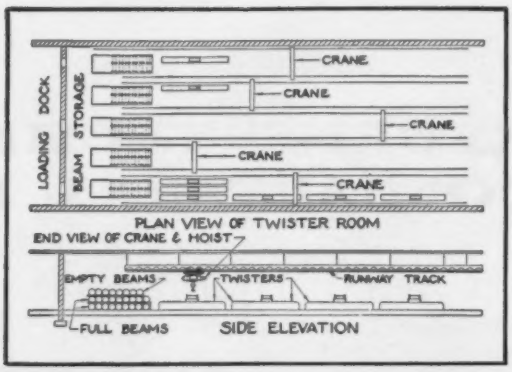
Laboratory Ring Spinning Machines. A Hungarian company is manufacturing a laboratory ring spinning machine equipped with an infinitely variable speed gear, permitting spindle speeds of from 5 to 10,000 rpm, and with infinitely variable drawing system delivery speed. Adjustment of speeds can be made continuously while the machine is in motion. The apparatus, which is about 47″ x 31″ x 31″ in size, is readily mobile, and can spin yarns ranging from 5s to 160s.

Single Bath Dyeing of Dynel-Wool Blends. The Textile Fibers Dept. of the Union Carbide Chemicals Co. has developed a new single-bath method for dyeing blends of dynel and wool which is said to reduce dyeing time by 50%. Two chemical additives which are recommended eliminate need for traditional neutralizing step on carbonized fabrics prior to dyeing, making compatible the cationic and anionic dyestuffs which are used.

Automatic Jig. An improved English "Autojig" is designed to speed up processing by reducing the human element in control. Featured are an electrical braking

Handling 36" Beams to Twisting Machines

Easy rolling hand-propelled Tramrail cranes with electric hoists of one ton capacity provide complete handling service for the entire twister room and at railroad dock and in beam storage. Beams are up to 36" diameter by 58" long.



THERE are two practical ways of handling heavy beams to twisting machines with creels on top: either the old slow method using cumbersome portable floor gantries, or the modern efficient method employing an overhead track or crane system. Progressive up-to-date textile mills have found the latter method so advantageous that overhead handling equipment has been specified for twister rooms in nearly every recent plant built for this purpose.

In the ultra-modern twister room of a prominent Southern mill, a Cleveland Tramrail system handles 36" diameter rayon beams from railroad dock to storage, thence to twisting machines. Empty beams are returned on the same equipment.

It is a simple easy task for a man without previous experience with Tramrail equipment to convey a beam and set it in position on a twisting machine. Where required two or more beams can be mounted on a twister frame with equal ease. Tramrail equipment eliminates the need of floor trucks entirely, as it transports the beams directly from storage to twisters without rehandling. By handling beams, and all other materials overhead, the chief source of floor wear and damage is eliminated.

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Overhead Materials Handling Equipment

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system to maintain constant tension after the operator has set a large scale tension indicator at the desired position and provision for varying speed from zero to 108 yards per minute on 24" diameter batches.

High-Speed Hosiery Knitting Machine. A new Italian machine, operating on the principle of continuous rotation and utilizing four feeding positions, is said to be able to make a complete seamless stocking in three minutes.

FIBERS AND YARNS

New Type Orlon Staple. Now being marketed by Du Pont is a new Type 72 Orlon acrylic staple developed for blending with cotton and for use in skin-contact apparel fabrics. Offered as 1.5 denier 1½" staple and priced at $1.08 per lb, the Type 72 fiber is claimed to provide outstanding comfort for sports shirts and underwear and features a high-degree of "built-in" whiteness, eliminating need for costly chlorite bleaching in blends with cotton.

Nylon. The Chemstrand Corp. has added 520, 1040, and 2080 denier yarns of textured "Cumuloft" to the line. The name "Cadon" has been adopted for Chemstrand's multi-lobal yarn which features silk-like hand, greater covering power, and good wicking properties. * * * Experimental quantities of a new type of Du Pont nylon yarn, engineered specifically for commercial mill texturing equipment, are being mill-tested.

Spandex Fiber. A new spandex (polyurethane) fiber has been developed by International Latex Corp. for use in corsets and brassieres. Garments containing the fiber will be on sale this fall.

Polypropylene. Dawbarn Bros. is now producing a monofilament slub yarn of polypropylene, primarily for use in automobile seat covers and for outdoor furniture.

Trilobal Textile Filament. Du Pont now has in commercial production four fibers covered by its U. S. Patent 2,939,201 for the production of synthetic fibers having tri-lobal cross sections: Antron Type 560 nylon for apparel, Type 90 nylon for tricot and hosiery, Type 501 nylon for carpets and rugs, and Dacron Type 62 for women's wear.

TEST METHODS

Gripping High-Strength Fabrics During Physical Tests. Two scientists have disclosed a technique for laminating gripped areas of certain fabrics with saran film to overcome difficulty due to slipping tendency of yarns in fabric during testing. Coefficients of variation were found to be low and procedure allows observation of trends and small differences not usually apparent with a less precise method.

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EXECUTIVE VIEWS

Prepared by a man who is closely identified with the textile industry.

The Blight of Socialism

SOME YEARS AGO a visiting Russian, being twitted about the poor progress Russia was making under communism, remarked that Russia was too poor to afford communism and that only the United States was rich enough to afford it. We are beginning to find out that we can't even afford socialism, which is a milder form of communism.

For the past 25 years, we have been living under what has been, for all practical purposes, a socialist-labor government. We have repeatedly referred to our brand of socialism as "socialism on credit," and it begins to look like the credit is running out—our national government has more and more difficulty financing and refinancing our national debt.

This past fiscal year the federal deficit was around 12 to 13 billion dollars, and Congress again had to raise the national debt limit a little further into the fiscal stratosphere.

We first embarked on these socialist adventures in the early days of the New Deal, when the socialists and communists had a series of field days proposing all kinds of impractical schemes for getting us out of the depression, which had been caused by too much inflation, which in turn was the very remedy the socialists proposed to use to end the depression.

The sound platform on which the Democrats won the 1932 election was almost completely ignored, and within two or three years practically every plank of the socialist platform of 1932 had been enacted into law.

The Democratic Party leadership vigorously denied the charge of socialism brought against it, but socialism is not a question of a party label. It is a matter of certain political and economic beliefs, and we have been neck deep in it for the last 25 years. During that time the remedy for every national economic ailment has been bigger and more irrational spending, with the government ever assuming a more and more dominant role in the management of state and local affairs and the regimentation of the entire economy.

The federal government seems to be pretty well dominated by the big labor monopolies so that it seems reasonable enough to feel that we have a socialist-labor government.

This combination automatically leads to more and more inflation and more and more economic trouble. The socialists constantly wish to expand the sphere of government influence and, of course, government spending and big deficits.

The labor monopolies have a fixed policy of perpetual inflation. The unlimited rapacity of these big rackets is amply shown by the attitude of the steel workers' union.

These people are among the highest paid in the world, with many fringe benefits denied to ordinary working people. And yet, because they exercise a complete stranglehold on the steel industry, they insist on endlessly demanding more and more money from the public for steel products.

The big labor barons exercise such frightening control over the Congress that it seems to be impossible to get any laws passed to deal with these labor monopolies as other monopolies are dealt with. What is generally regarded as one of the most corrupt of all of the labor monopolies, recently threatened to tie up all transportation in the United States if any attempt were made by Congress to minimize the corruption in this oversized racket.

To date, the Congress has exhibited a remarkable docility in the presence of these threats. It seems that a majority of the Congress are either afraid of the leaders of the labor unions, or so indebted to them for support that they can not risk their displeasure. *Continued p. 89*

BARBER-COLMAN

SEE THESE MACHINES IN ACTION AT GREENVILLE

SERIES "M" MODELS NOW MADE IN **10** SIZES
FROM 36" TO 126" BY 10" VARIATIONS

21st SOUTHERN TEXTILE EXPOSITION
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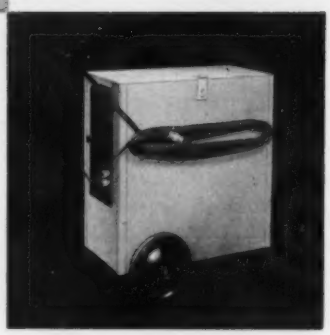
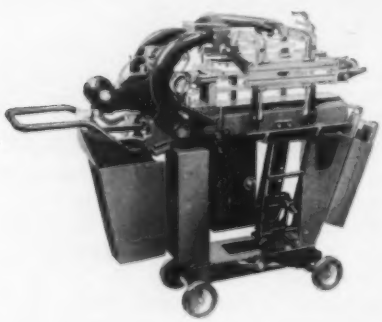
GREENVILLE S. C.
OCTOBER 3rd - 7th 1960

PORTABLE *Warp-Tying Machines* FOR ALL PURPOSES

The BARBER-COLMAN line of warp-tying machines has now been extended to cover practically every conceivable application. As noted above, the Type "M" machines are now available in *ten* sizes. These machines tie the *full width* of the warp in one operation, work directly in back of the loom, and are made in several types to tie-in cotton, spun yarns, filaments, wool, worsteds, or synthetic yarns from a flat sheet or from an end-and-end lease. When using a Type "M" Warp-Tying Machine, none of the weaving elements need be removed nor any of the loom settings disturbed. The picture at the right shows the special cart used for protecting the Knotter Unit when not in use and for carrying it from one frame to another when two or more are employed. This carrier also contains the variable speed-controller for the Knotter Unit. These machines are probably the most versatile available for most mill conditions.





IMPROVED SERIES "L" MODELS IDEAL FOR CERTAIN CONDITIONS

BARBER-COLMAN Model "L" machines are familiar to two generations or more of mill people, because they have been on the scene in one form or another for 45 years. The latest designs, one of which is shown here, have many up-to-date improvements which distinguish not only their appearance but also their operation and efficiency. These compact, versatile, and easily-moved machines have many important applications in both large and small mills. Barber-Colman representatives are thoroughly versed in the usefulness and applicability of both Model "L" and Model "M" machines, and can be consulted with confidence as to which might suit a given situation best. Also, it is important to know that all users of Barber-Colman machines are served promptly and skilfully by an alert service group of wide experience.

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THE QUESTION is often asked, "What is wrong with a welfare state? Surely the welfare of the people should be the principal concern of a government."

The term "welfare state" was applied in derision to attempts to make a central government accept responsibility for phases of the welfare of a people that no government could hope to assume successfully.

Every nation which has become a welfare state has run into trouble. The Socialist-Labor Party in England almost ruined that country before the people turned to a conservative government. The late Peron Regime in Argentina was hailed as a splendid example of the "welfare state," and now the Argentineans are desperately trying to get a gutted economy back on its feet.

Other South American countries tried this socialist idea—that the government should be responsible for general welfare. Not simply responsible for *promoting* the general welfare, as is set forth in our Constitution, but responsible for *guaranteeing* it. All of these adventures came to grief.

One of the latest attempts at prosperity by fiat has been in Cuba. A recent newspaper report states that six months after the Batista Regime was ousted, Cuban business was almost at a standstill.

This article went on to state that when the sugar cane harvest was finished it was estimated that half of the entire Cuban labor force would be unemployed.

IT HAS been very encouraging to see that the President had some success in trying to hold down the wild spending promised by the 86th Congress when it opened up last January. That the President had some success in trying to balance the budget was probably due more to the feeling back home than any reformation of the confirmed spenders in the Congress.

More and more influential newspapers are beginning to battle seriously the inflation which is slowly sapping the vitality of our economic system, and which is an inescapable part of the socialist program which we have been following for 25 years.

It takes constant needling from the citizenry to impress their ideas upon their Congressmen and Senators. The big labor unions maintain very powerful lobbies, and shake apparently very big sticks under the noses of our legislators. And it therefore behooves the ordinary citizen who believes in private enterprise, and does not believe in socialism, to remind his representative constantly of what his constituents are thinking.

A nation can afford to go into debt to meet the demands of a short and drastic emergency. But a condition that we realize will exist for years and years is not an emergency, but a way of life to which we must adapt ourselves.

And it is ruinous beyond any doubt to continue these endless government deficits for the purpose of embarking on more and more socialistic adventures.

FUTURE EVENTS

Date		Event	Location
Sept.	7-8	Canadian Textile Seminar	Queen's University Kingston (Ont.), Canada
	8-9	Combed Yarn Spinners Association	The Cloister Sea Island, Ga.
	8-9	Textile Quality Control Association	Clemson House Clemson, S. C.
	9	Northern New England Section AATCC	Wachusett Country Club West Boylston, Mass.
	10	Southeastern Section AATCC	Atlanta Athletic Club Atlanta, Ga.
	10	South Central Section AATCC	Hotel Patten Chattanooga, Tenn.
	14-17	Southeastern Maintenance & Engineering Show	State Fair Arena Raleigh, N. C.
	15-16	Textile Processing Symposium, American Gas Association	Sedgefield Inn Greensboro, N. C.
	15-16	Chattanooga Yarn Association outing	The Read House Chattanooga, Tenn.
	17	Southern Textile Overseers Association family meeting	Greenwood, S. C.
	17	South Central Section AATCC	Hotel Patten Chattanooga, Tenn.
	17-21	National Safety Congress	Conrad Hilton Chicago, Ill.
	18-19	Institute of Textile Technology technical advisory committee and board of trustees	I.T.T. Charlottesville, Va.
	22-23	First International Textile Dyestuffs, Finishes, and Auxiliaries Exhibition	Free Trade Hall Manchester, England
	23	Western New England Section AATCC	Blake's Restaurant Springfield, Mass.
	23-24	Piedmont Section AATCC	Hotel Charlotte Charlotte, N. C.
	28-30	North Carolina Textile Manufacturers Association meeting	The Carolina Pinehurst, N. C.
	28-29	Chemical Finishing Conference	Statler Hotel Washington, D. C.
Oct.	3-7	Southern Textile Exposition	Textile Hall Greenville, S. C.
	6-8	AATCC national convention	Sheraton Hotel Philadelphia, Pa.
	7	Southern Textile Overseers Association annual meeting	Hotel Greenville Greenville, S. C.
	19-22	Carded Yarn Association annual meeting	Grove Park Inn Asheville, N. C.
	22	Textile Operating Executives of Georgia slashing and weaving discussion	Georgia Tech Atlanta, Ga.
	22	Alabama Textile Education Foundation	Auburn University Auburn, Ala.
Nov.	12	Textile Education Foundation Inc.	Georgia Tech Atlanta, Ga.
	12	Alabama Textile Operating Executives carding and spinning discussion	Thach Auditorium Auburn, Ala.

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Some items just lie on the shelf, eating up overhead. Murdering you...You make your money on merchandise that moves. Du Pont fibers help goods do exactly that: move!... Du Pont fiber trademarks are known, trusted, proven. They're miles ahead in consumer preference. (Fact: 2 to 1, men in a recent survey preferred a jacket identified as Du Pont nylon over a jacket of the same brand identified as nylon.)...And Du Pont keeps building this preference through a broad advertising program, including "THE DU PONT SHOW WITH JUNE ALLYSON"...Yes, it makes sense to feature the fibers that help you move goods: Du Pont fibers.

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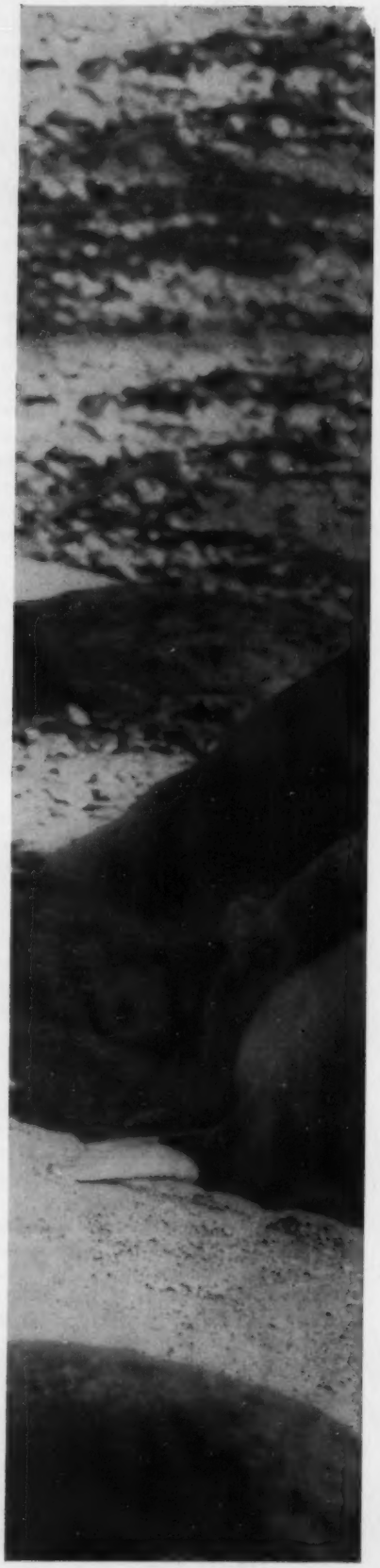

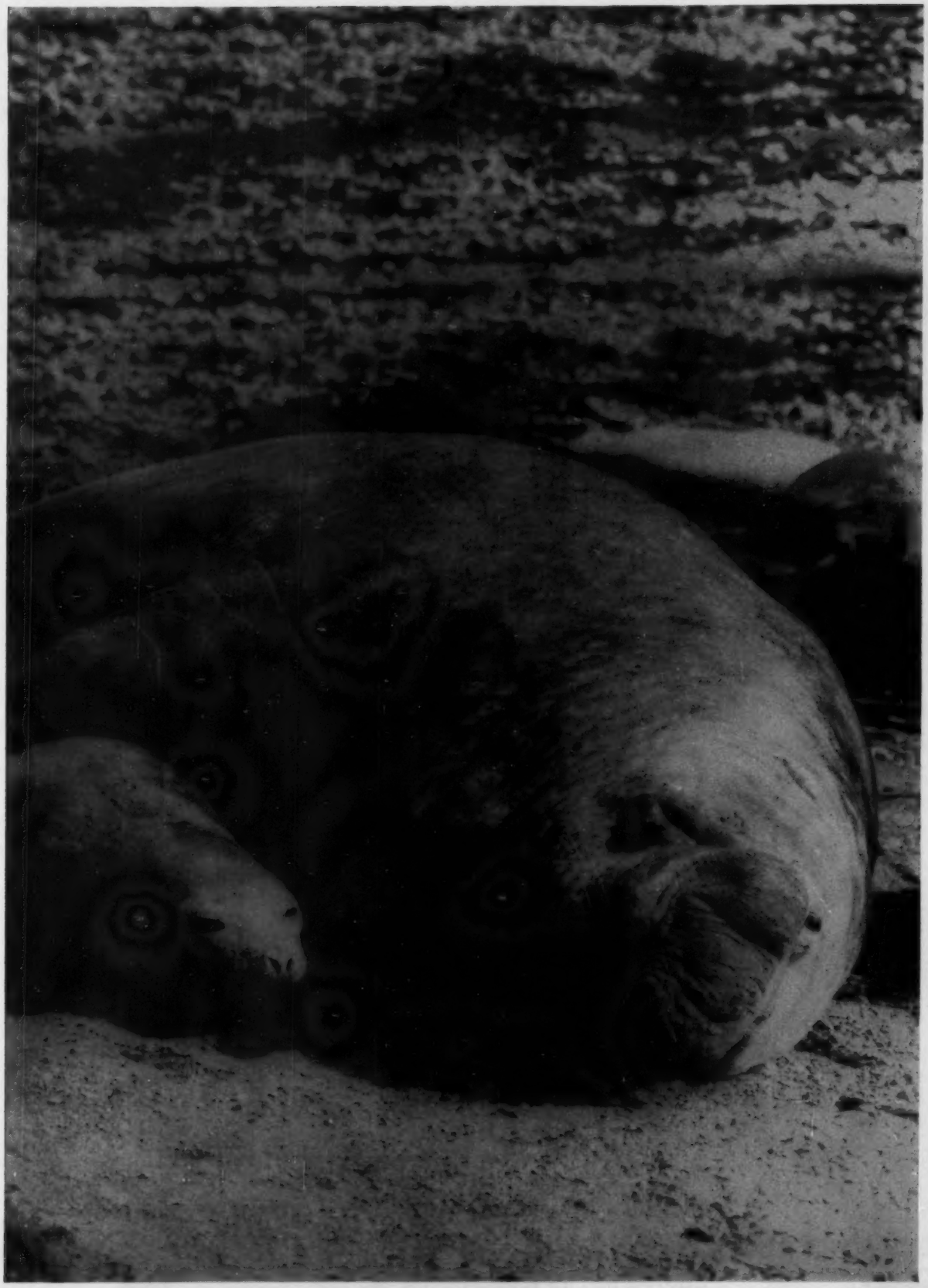

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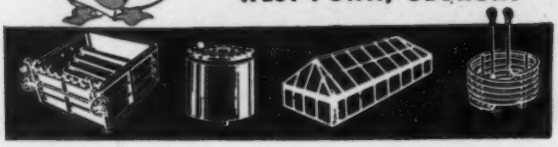

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Man-Made Fibers — 1960

ARTICLES IN THIS SPECIAL FEATURE

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Dollars and Cents of Textured Yarns

by Eldon Stowell
Stowell & Co.
Exclusive

EVEN FOR a spinner, throwster, or other processor of textured filament yarns to have sat in the seat of a Monday-morning quarterback in the early part of 1960 still wouldn't have given him a sure-fire bet. Since 1952, timing during the initial stage of these new fiber processing techniques was vital. So important perhaps that some concerns have paid for machinery in the first three years of operations; others more reluctant and conservative are just entering the field.

As one knows, initiative and yet belatedness on the part of the textile industry are woefully common and the joys and tears are drunk and shed from 1407 Broadway to Decatur. Newness remains a necessity to this and any industry.

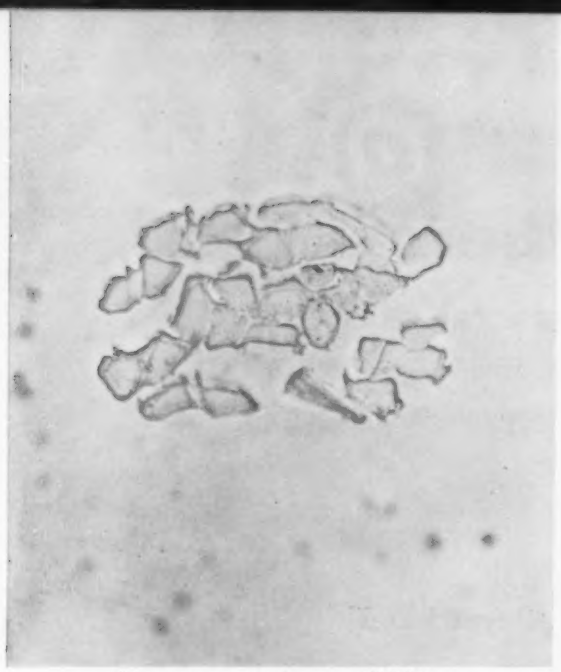
Textured yarns have been on the market since 1950 and in sizeable amounts since 1955. Introduced as stretch yarns in 1952, they later encompassed stuffer box, air jet, and other methods of filament distortion wherein the parallel filament mass was materially increased several fold, up to 500%. This basis idea should never be sold short and in the writer's opinion will continue to expand. Statistically, textured filament yarns today account for approximately 65 million pounds of acetate, nylon, polyester, and rayon, if all processes are included.

Spindleage. In 1955 there were about 120,000 spindles on conventional three-step stretch yarns, with 15 or more licensees under the basic patents. False-twist spindles totaled roughly 35,000 spindles with close to 20 licensees. The establishment of these licensees and developing the processes had taken about four years.

In the following four-year period the number of licensees increased only to about 30, while the number of spindles increased over 400% for false-twist yarns and the conventional decreased to a fraction of the former figure. Basically, the original starters remained in the business and continue even today. It should be noted that in stretch yarns the false-twist spindle had replaced the more costly three-step con-

Continued on page 114

This is the fifth in a series of articles on the textured yarns. The first, "Stretch Yarn," appeared in the August, 1959, issue of TEXTILE INDUSTRIES, pages 102-105. The second, "Taslan Textured Yarns," appeared in the March, 1960, issue, pages 84-89, 107. "Saaba Textured Yarn," the third article, was published in the May, 1960, issue, pages 192-193, 298, 300. The fourth article in the series, "Spunize Textured Yarn," appeared in the June, 1960, issue, pages 91-92; and the sixth, "The Impact of Textured Yarns on the Textile Industry," appears in this issue, pages 111-113.



Warp yarn cross section, grey silk fabric.

Warp yarn cross section, boiled-off silk fabric.

Silk-Like Fabrics

Research of a fundamental and practical nature is suggesting new fiber cross sections and new finishing techniques for man-made fibers. The goal: To duplicate the aesthetic properties of silk

Staff prepared
Exclusive

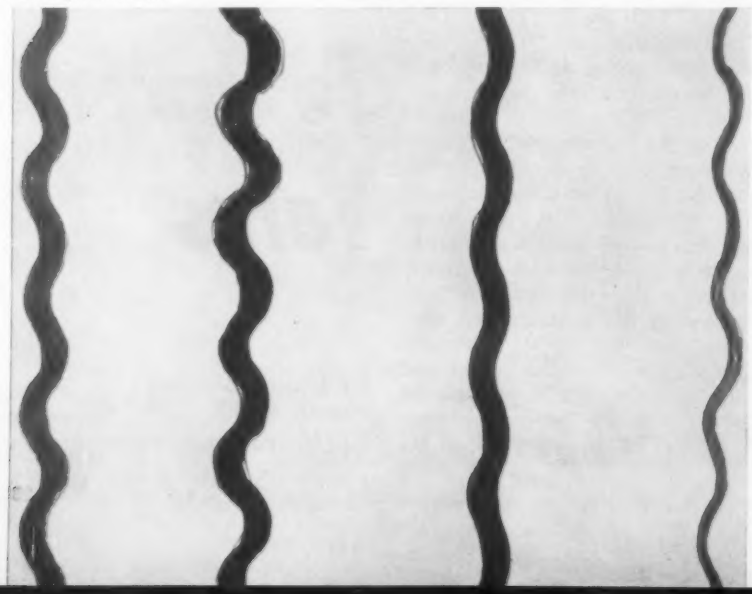
AMONG natural and man-made fibers, silk is aesthetically unique. Its inherent properties seem to acquire added richness in fabric form, appealing to eye and hand alike. The natural luster of silk, the brilliancy of colorings which it affords, and its resilient hand are recognized as an exclusive combination of properties.

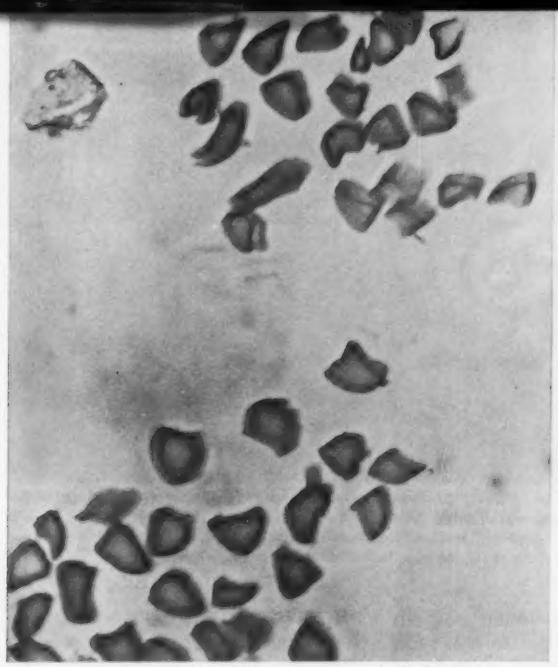
But it is not for aesthetic reasons alone that silk has been universally regarded as a fiber of luxury. Its inherent properties also contribute to lasting comfort, and such other properties as high strength belie its delicate appearance. Unfortunately, silk has never been available in large supply, and its cost has always placed it beyond the means of many. Thus, many efforts have been made to imitate its aesthetic properties in materials of lower cost.

In recent years, science has begun to make inroads in probing the structure and make-up of silk through a more meaningful research, which coordinates projects carried on at many levels, of a fundamental and practical nature. This comprehensive research, by relating properties to structure, is suggesting routes for the design of new fibers with genuine silk-like properties.

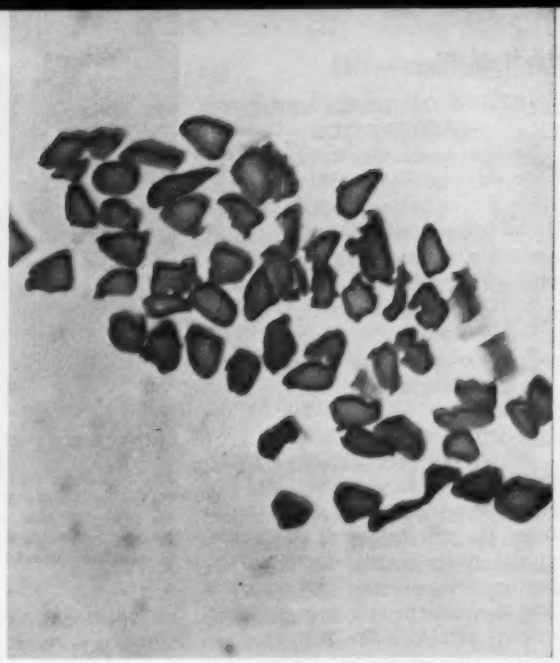
In this article, two recent fiber developments, and the finishing techniques they call for, will be

Photomicrograph of warp yarns taken from a silk fabric, left to right: grey, finished, acid-treated, boiled-off.





Warp yarn cross section, acid-treated silk fabric.



Warp yarn cross section, finished silk fabric.

from Man-Made Fibers

discussed. Already known to the trade as Dacron Type 62, a modified cross-section filament yarn, and "Antron" tri-lobal multifilament nylon yarn, they are showing some promise in fulfilling demand for fibers with the aesthetics of silk.

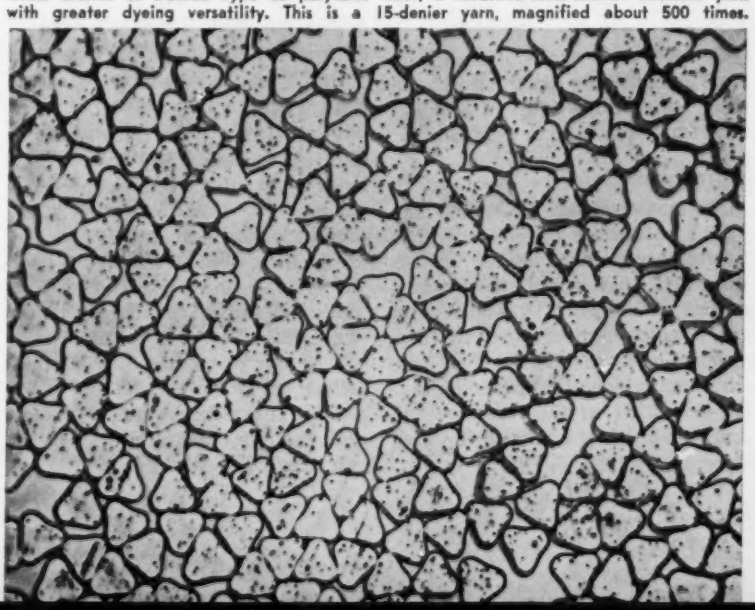
In the development of these fibers an important phase centered on a study of silk-fabric aesthetics. Certain questions, in particular, were of interest: What are the most desirable aesthetic properties of silk? To what can they be attributed? Can they be enhanced by altering fabric construction? Are some acquired by finishing?

To seek answers to these questions on a practical level, or more precisely, to observe the effects of wet processing on the aesthetic properties of silk, the Du Pont Company conducted a study of silk fabric finishing with the cooperation of Stafford Printers, Inc., Stafford Springs, Conn., dyers, printers, and finishers of silk fabrics. The selection of Stafford Printers as a "pilot laboratory" was made in appreciation of two factors: Stafford's long experience as silk finishers, and their gradual diversification into fabrics of man-made fibers and blends, though not to the complete exclusion of silk.

Upon completion of the plant trials, and analysis of collected information and data, the results were presented in a report, "Study of Silk Fabric Aesthetics," by Paul N. Lagassé, a Du Pont engineer, who headed up the project. His report appears in the following paragraphs to provide suitable background material for subsequent portions of this article. Some sections of his report are presented here in condensed form while others are printed in their entirety for a better understanding of the silk fiber.

Continued on next page

Cross section of Dacron Type 62 polyester fiber, a modified-cross-section filament yarn with greater dyeing versatility. This is a 15-denier yarn, magnified about 500 times.



STUDY OF SILK FABRIC AESTHETICS

Earlier research work by Du Pont on silk-like fabrics of man-made fibers indicated that six aesthetic properties of silk were most desirable. These are listed here in their order of importance:

1. "Dry" tactile hand
2. Liveliness
3. Suppleness and drape
4. Covering power
5. Luster
6. Scroop

In the project carried out at Stafford Printers' plant, silk finishing operations were studied from the standpoint of their individual contributions to these six aesthetic properties. Wherever it was surmised that a finishing step might affect aesthetics, beneficially or adversely, a 10-yard sample was removed from the lot for further analysis and testing. Two fabric constructions were processed for study: a 2 x 2 twill and a taffeta. Since the effects observed were essentially the same on both fabrics, the taffeta construction was selected for the detailed laboratory analysis because it exemplified the ultimate aesthetics desired of silk-like fabrics of fibers which were under study and development at the Du Pont laboratories.

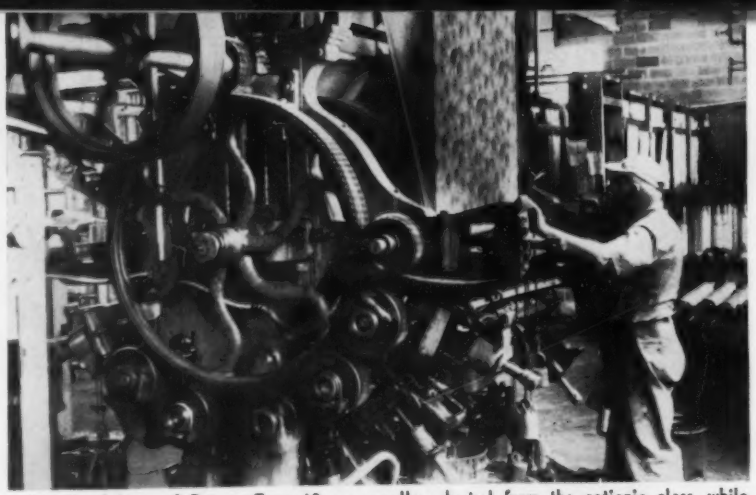
The trial lots followed a conventional sequence of operations, of long standing at Stafford Printers. These were as follows:

1. Boil-off
2. Dyeing
3. Acid treatment
4. Framing
5. Printing
6. Finish application and calendering

From a study of the observed effects of finishing on the aesthetic properties of the silk taffeta, the following conclusions were drawn:

BOIL-OFF

The conventional boil-off is done at the boil while the fabric is in a completely relaxed state. It was observed that complete removal of the sericin gum is essential for the development of inherent fiber properties in the fabric. The sericin gum, which constitutes approximately 30% of the fiber weight, imparts much stiffness to the grey fabric.



Colors for fabrics of Dacron Type 62 are usually selected from the cationic class, while for fabrics of Antron they are selected from the acid class. The ultimate goal is to obtain silk-like brightness with required washability and lightfastness. The engraving technique is modified for printing fabrics of Antron to achieve sharpness.

Finished fabrics which contain all or a portion of the sericin gum have entirely different fabric aesthetics, because of the gum's influence. A boiled-off silk fabric, however, has a "dry" tactile hand; it is extremely lively and supple; it has very good covering power, and a soft, bulky feel.

DYEING

The influence of dyeing on aesthetics was found to be very slight, with only minor changes in the covering power and in the loose, bulky hand of the fabric, resulting from mechanical working and swelling of the silk fibers.

ACID TREATMENT

Following dyeing, the fabric is worked in a formic acid solution, which hardens the fiber's surface and lends the fabric a crisp hand, commonly known as "scroop." Other aesthetic properties are not affected by this treatment.

FRAMING

In this operation the dried silk fabric is steamed and framed to a width established for the construction. The operation also straightens the filling yarns by controlling the relative speed between take-up and frame. This pulls out the fabric slightly in the warp direction.

The operation has only a small effect on fabric aesthetics. There is a slight decrease in suppleness, and the fabric acquires a smoother surface.

PRINTING

Though the fabric is exposed to high pressures and tensions, the over-all effect of printing is beneficial to fabric aesthetics. Aside from a decrease in suppleness and change in hand, that becomes "thin" yet remains full, the fabric retains its major aesthetic properties to a high degree. The printed fabric exemplifies the ultimate in silk aesthetics.

FINISH APPLICATION AND CALENDERING

Most finishes applied to silk improve its functional properties, but in many cases they also produce undesirable aesthetic changes. In the case of the taffeta fabric under study, the finish consisted essentially of a simple starch, which imparted stiffness and crispness. The final cold calendering develops the desired hand.

The finished fabric, incidentally, has a wash shrinkage of about 7% in the warp direction. This is caused by the warp tensions of framing and subsequent processing. Prior to framing the fabric is stable to washing.

PROBABLE MECHANISMS RESPONSIBLE FOR SILK FABRIC AESTHETICS

In the concluding phase of the study, the collected data and information were correlated with the results of earlier research carried on at many levels. Interpretation of the combined material by Du Pont scientists resulted in the formulation of theories relative to the mechanisms responsible for the

Processing under relaxed conditions is emphasized by Stafford Printers in finishing fabrics of Dacron Type 62 and Antron tri-lobal multifilament nylon. Such gentle handling enhances fabric appearance and hand. The nonround cross sections of these fibers impart an irregular and more silk-like luster to the fabric.

aesthetic properties of silk.

In a section of the report headed, "Probable Mechanisms Responsible for Silk Fabric Aesthetics," each of the six aesthetic properties is discussed separately. Particular emphasis is placed on the resilient properties of the silk fabric.

"Dry" Tactile Hand. "Silk is unique among natural fibers in that it is a filament yarn which when woven into fabrics, produces a spun-like hand, referred to as the dry, tactile hand of silk fabrics. A study of yarn and fabric characteristics indicates that this hand is probably due to (1) the irregular (basically triangular) fiber cross-section, (2) the loose bulky fabric structure caused by the combination of zero-twist warp yarns and the natural swelling of the silk fiber during wet processing, (3) the random longitudinal surface irregularities (striations), and (4) the fine denier per filament."

Liveliness, Suppleness, and Drape. "These three factors are discussed together because the type of liveliness characteristic of silk fabrics is usually associated, by subject evaluators, with their concept of suppleness. This type of liveliness is a smooth, supple type of response from mild deformations as opposed to the abrupt, explosive type of response characteristic of less supple fabrics. The silk-type of liveliness is analogous to the response of a fine coiled wire spring (similar to the "slinky" type of toys), whereas the liveliness of less supple fabrics is analogous to the response of a flat steel spring.

"The mechanisms responsible for the lively supple nature of silk were thought to be associated with the stable high modulus of the silk fiber and the fabric structure mobility, caused by the removal of the sericin gum (24 to 26% weight loss). Recent work has shown that supple lively fabrics can be made of yarns which have a relatively low initial modulus—such as nylon and Dacron—and that fabric made from degummed silk is as lively and supple as silk fabrics degummed after weaving. These two facts have led to the formulation of new theories for the explanation of silk's lively, supple nature.

"On the basis of these new developments and other related work, it now appears that the lively supple nature of silk is due to several interdependent factors which are (1) highly elastic-like fiber recovery properties, (2) highly crimped fabric structure, (3) loose mobile fabric structure, and (4) fine - denier - per - filament yarns.

"Of the four factors the first is probably most important because it depends upon inherent fiber properties. If the fiber is initially deficient in recovery properties, then fabrics prepared from it will not be lively.

"If we start with a satisfactory fiber and use a high-denier-per-filament, the resultant fabric will be lively but the liveliness will correspond more to that of a flat spring, due to the stiffness of the higher-denier-per-filament fibers.

"Construction of a fabric from a low-dpf, high-recovery fiber does not insure a lively, supple fabric. In experiments in which grey silk fabric was boiled-off under taut conditions, the fabric produced has a stiff boardy hand rather than the lively, supple hand normally associated with silk which has received a relaxed boil-off.

"The only discernible difference between fabrics finished taut and relaxed is the degree of crimp produced in the yarns by relaxed finishing. In the fabric finished under restrained conditions the weave crimp has a low amplitude and the response of the fabric is more nearly analogous to that of a flat steel spring. In the relaxed fabric, the weave crimp has a much higher amplitude and the response is more nearly analogous to that of a coiled spring, producing liveliness coupled with a high degree of suppleness. Most silk fabrics are characterized by extremely high crimp and are extremely lively and supple. If the warp crimp is reduced by restraint during finishing, the fabric loses its supple nature.

"The final important requirement in attaining silk-like aesthetics is to provide a fabric structure which will allow the spring-like crimped structure to respond with a minimum degree of restraint. If the fabric is constructed too tightly, even though there is a high weave crimp amplitude, the effect is analogous to that of compressing a coiled spring and then subjecting it to transverse deformation. In this case, the compressed spring reacts more like a flat steel spring and in a similar manner, the compressed fabric structure performs likewise.

"In the silk fabric the swelling of the fiber during wet processing provides sufficient permanent fabric deformation to leave a loose mobile structure in the dry form."

Covering Power. "Silk fabrics have extremely good covering power even though they are extremely lightweight. This excellent cover appears due to (1) the use of zero-twist yarns in the warp, which is made possible by the nat-

ural sizing action of the sericin gum, (2) the loose bulky nature of silk yarns due to the swelling of the fiber in wet processing, (3) the non-round cross section, and (4) fine denier per filament."

RESULTS

In summarizing the observed effects of finishing on the aesthetic properties of silk, Mr. Lagassé's report pointed out that any finishing process beyond the boil-off alters some of the inherent aesthetic qualities of the fabric. These changes are in some cases desirable, and in others undesirable, but are necessary to give the fabrics added functional properties, or to meet the demands of the current market. The most marked alterations in properties occur after finish applications; namely, through the use of resins, silicones, starches, and the like. Minor alterations in inherent properties occur during dyeing, acid treatment, and printing.

Analysis of the boiled-off silk fabric showed that the dry tactile hand, liveliness, suppleness and drape, covering power and luster, are all inherent properties of the silk fiber. Such minor properties as scroop and body are basically inherent as well but are developed through finishing. (End of report.)

NEW PROPERTIES FOR "OLD" FIBERS

The Lagassé study added to the storehouse of knowledge that was being acquired at other levels of research in the Du Pont laboratories—all toward the development of fibers with silk-like aesthetics. Several years after the practical work had been completed at Stafford Printers, two fibers with such properties were announced: Dacron Type 62 polyester fiber, a modified cross-section filament yarn; and Antron tri-lobal multifilament nylon yarn.

Dacron Type 62 polyester fiber can be described as a semi-dull, more dyeable fiber, of normal tenacity, with silk-like appearance and hand. Several properties distinguish it from other Dacron types. It is somewhat more susceptible to acid and alkaline hydrolysis when exposed to extreme conditions. However, dilute solutions of alkali must be used to obtain maximum "silk-like" aesthetics during the sequence of finishing operations. It accepts disperse, cationic, and one or two azoic dyes. In light to medium shades, it dyes about 10-15% heavier than Dacron Type 56.

The Antron tri-lobal multifilament nylon, aside from its non-round cross sectional shape, has the characteristic properties of nylon.

TENSIONLESS PROCESSING: KEY TO SOUND FINISHING

As soon as these fibers became available, Stafford Printers began to experiment with them in trial lots. Meanwhile, their merchandising possibilities were explored. As markets appeared to be developing, their finishing routines were refined, and additional lines were styled. At the time of this writing, in late spring of this year, the Stafford plant has processed substantial yardages, largely for the women's wear trade.

In one important respect Stafford Printers are in a good position to process these fabrics; that is, through their long experience in handling silk. Though fabrics of man-made fibers are normally processed under tension, the procedure in finishing Dacron Type 62 and Antron fabrics is to follow the sound practices used in silk finishing—processing in a completely relaxed condition for greatest aesthetic effects.

This sound principle of processing without tension is apparent in the operations which have been selected by Stafford Printers. It is also reflected in the proper choice of equipment. The steps outlined below apply only to fabrics that are printed, though in principle they apply to the dyed fabric as well.

In the first step of processing fabrics of Dacron Type 62, the fabric is heat set in the grey on a modern, flexible, gas-fired finishing range, where fabrics can be dried and cured, or dried and heat-set, at any temperature up to 500 F. The range is equipped with temperature controls and recording devices.

The heat-setting process, as is well known, has several purposes. If the fabric is in a relaxed condition, heat-setting produces a stabilizing effect, the amount of fabric shrinkage being dependent on a time-temperature relationship. As temperature increases, the amount of shrinkage increases with less time being required for complete stabilization. The purpose of heat-setting in the grey is to control width, remove grey cloth creases, and impart resistance to creasing.

In the next operation, carried out in the beck, scouring is combined with the very important caustic treatment, which is then followed by neutralization. In the caustic treatment, a controlled amount of fiber is lost through solvent action. This is analogous to the removal of sericin gum from silk fabrics.

The fabric is then bleached, and dried in a loop dryer. Then it is framed to width for printing.

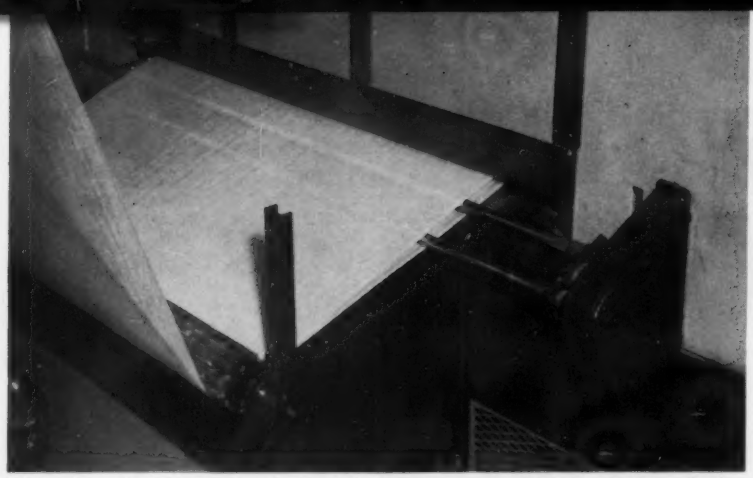
A distinguishing chemical property of Dacron Type 62 is its increased printability. As pointed out earlier, it accepts disperse, cationic, and some azoic dyes. And not unlike other Dacron types, it accepts the resin-bonded pigments. The cationics, by virtue of their brilliancy and clarity of shade, are of greatest interest in printing helping to simulate silk-like color aesthetics. The cationics are prepared in specially formulated pastes, and after printing and drying follow one of two routes—rapid aging or the much longer cottage steaming.

Within the last year, Stafford Printers has installed a loop ager, which affords tension-free processing; thus, there is a continuation of processing under relaxed conditions.

After printing and steaming, the fabric is soaped, without tension, in an open-width range, and frame dried. Then it enters final finishing stages. These include (1) relaxed heat-setting, which assists fixation of colors and assures stabilization of fabric, and (2) application of a formulation containing an antistatic agent.

In processing fabrics of Antron, no significant fiber modification takes place, as with Dacron Type 62, which receives a caustic treatment. It might be said that fabrics

Continued on page 113



Wet split rods between size box and drying are recommended for slashing Creslan.

Slashing Creslan

Staff report* Exclusive

YARNS spun from Creslan acrylic fiber may be woven with excellent efficiency under normal mill conditions. While many types of products and equipment have been found suitable for the commercial sizing of these yarns, the size formulas and slashing conditions provided here are recommended for optimum performance.

Typical size formulas include a modified starch, a good binder, and a lubricant.

1. Starch

Modified starches should be used in slashing yarns spun from Creslan, because of the viscosity limitations of regular starches.

2. Binder

The use of a binder is necessary to impart better adhesion of the size to the yarn and to coat the yarn surface with a protective film.

3. Lubricant

A low-melting-point emulsifiable wax is used as a lubricant and softener.

Since Creslan is hydrophobic in character, the size is not absorbed; it builds up or accumulates on the surface. For this reason, the size formula should be concentrated in order that the proper amount may be applied to the yarn.

Stretch. For best weaving performance, a low stretch of between 1% and 2% should be maintained in order to preserve yarn elasticity.

Squeeze Roll Pressure. Because the size is not absorbed by Creslan, a relatively low squeeze-roll pressure, in the vicinity of 800 pounds, is recommended. In blends of Creslan with other hydrophobic fibers, however, roll pressures may be increased slightly.

Moisture Retention. A moisture retention of approximately 5% should be maintained. Over-drying should be avoided since it causes excessive shedding.

Wet Splitting. The use of split rods between the size box and the first drying cylinder lessens adhesion of adjacent ends, thus decreasing yarn tension. Whenever the following conditions exist, an increased number of split rods is recommended:

1. Increased number of ends.
2. Finer yarn count.
3. Increased size concentration.

Slow rotation of split rods in either direction will minimize size build-up and prevent lapping of yarn sheet.

Factors Governing Size Formulation. Four main factors must be considered in determining the specific size formulation to be employed:

1. Fiber Content

The higher the content of Creslan acrylic fiber, the more highly concentrated the size formulation must be.

2. Yarn Count and Denier

High yarn counts and finer deniers pick up more size than do coarser yarns and heavier deniers.

3. Fabric Construction

Size pick-up for regular constructions should be between 14% and 16%; for high sley, tightly constructed fabrics, 17% to 20%.

4. Temperature

Maximum size-box temperature should be no higher than 190 F. It is important to maintain size box

After-waxing is recommended for Creslan warps to reduce shedding in weaving.

*From information provided by officials of the Fiber Division, American Cyanamid Co.

TABLE 1. Typical Size Formulations for Creslan Acrylic Fiber and Blends

	Size		Binder		Lubricant		Squeeze Roll Pressure lb	Size Box Temp °F	Cyl Temp °F
	Type	Amount lb	Type	Amount lb	Type	Amount lb			
Formula A—100% Creslan	Modified starch of medium fluidity (Kofilm 50, Penford Gum 280, or equivalent)	140	Elvanol 72-60	25	Emulsifiable wax	6	800-900	190	210 max
			or Rezosol 1460	40					
Formula B—Creslan/wool	Same as Formula A	130	Rezosol 1438	35	Emulsifiable wax	8	900-1100	190	210 max
			or Elvanol 51-05	25					
Formula C—Creslan/cotton or Creslan/rayon, 70/30	Same as Formula A	140	Elvanol 72-60	20	Emulsifiable wax	6	800-1000	190	210 max
			or Rezosol 1460	35					

NOTES—1. All formulas are for medium-count yarns.
2. All formulas are based on 100 gallons of size mix.
3. Desired pick-up is obtained by adjusting formula and/or squeeze-roll pressure.

temperatures within a narrow range since differences in temperature result in changes in viscosity, which in turn considerably affect size pick-up.

Cylinder temperatures should not exceed 210 F. Where the temperature of individual cylinders can be regulated, the first and last cylinders should be operated at a lower temperature than those occupying intermediate positions. If controlled in groups of three cylinders, the first and third sections should run at a lower temperature than the second section.

On a hot-air slasher, the temperature of the drying unit should not exceed 240 F.

Size Formulas. The three typical size formulations presented in *Table* 1 have been employed successfully. Depending on equipment available, as well as the factors mentioned in the preceding section, these formulas may be modified, if necessary.

Mixing Procedure:

1. Draw approximately 65 gallons of cold water into the mixing kettle. Start the agitator and run it continuously throughout the mixing procedure and storage.
2. Add Elvanol or Rezosol to the cold water and agitate for five minutes.
3. Add starch slowly and agitate for ten minutes.
4. Add wax.
5. Raise temperature slowly to 212 F.
6. Cook for forty-five minutes at the boil.
7. Add water to bring mix to 100 gallons.

If Rezosol is used, the storage kettle and size box temperature should not be below 190 F. The pH for Rezosol 1460 is 8.0 to 8.5. In the event the material has been stored for more than three months, the pH should be checked; if below 8.0, it can be adjusted by adding soda ash.

A moisture retention of about 5% should be maintained in slashed Creslan warps. Avoid over-drying; it causes excessive shedding.

Teflon Coating. To prevent yarn from sticking to the surface of the cylinders, the first three or four cylinders should be coated with Teflon fluorocarbon.

After-Waxing. After-waxing reduces shedding in weaving. The warp lubricator is located between the last cylinder and the main split rod. The same wax as is used in the size formula is melted and applied to the yarn.

The rate of speed should be about 1/10 of the machine speed. A heavy warp requires that the roll turn somewhat faster.

Cleaning Kettles, Size Boxes. Size kettles, boxes, and lines should be cleaned thoroughly before changing to a different size formula. For this purpose, twelve pounds of soda ash (sodium carbonate) may be dissolved in 100 gallons of water. The solution should be brought to a boil in the cooking kettle with the agitator running.

The solution is then pumped into the storage kettle and boiled for a few minutes, then into the size box. (Do not cook if squeeze roll is covered with a blanket.)

Scouring. The following two methods of desizing are suggested:

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DYEING SYNTHETICS WITH AZOIC DYES

by James E. Flint

Technical Representative
Dyestuff & Chemical Division
General Aniline & Film Corp.

Exclusive

WITH THE widespread acceptance of synthetic fibers it has been necessary to develop new dyestuffs and new procedures in order to meet end-use requirements and to produce economical methods of dyeing these fibers and blends. New disperse-type colors and new cationic dyes have met these requirements to some extent, but application of the azoics has provided the means of producing dark shades economically and with necessary fastness properties. While all the newer synthetics can be dyed with azoics to some degree, these colors have shown to greatest advantage in dyeing the polyesters and such acrylic fibers as Acrilan (regular type), Darvan, and Creslan.

Cellulose acetate has long been dyed with azoic combinations, with the best reproducibility being obtained by applying the base, followed by diazotizing and developing with the coupling component. In our opinion, better results are obtainable in a shortened dyeing procedure by applying the Naphthol and Fast Color Base simultaneously, rinsing, and treating with a solution of nitrous acid. It is not possible to use Developer BON with certain bases by this procedure, but such Naphthols as AS-D and AS-OL are very satisfactory.

Cellulose triacetate (Arnel) can be colored by the same procedures, with the simultaneous application to be preferred. It is necessary to use a carrier, or to dye under pressure, to exhaust the Base and Naphthol on Arnel. The nitrous acid treatment must be given at a higher temperature, or for a longer duration, to complete coupling on this fiber.

Nylon also can be dyed with azoics by a similar procedure as for acetate but it requires a higher temperature for development. Many dyers state that the Base and Naphthol should be applied from a highly alkaline bath, but our experience shows just the opposite. A neutral or slightly acid pH assures the best shade reproducibility.

It is in the field of polyester fibers that the azoics have proved most useful, with black shades being the most important. While it is possible to dye the polyesters by applying the Base, rinsing, applying Developer BON, and then developing with hot nitrous acid, this process is unduly long, and the simultaneous application of the Base and Naphthol should be used in most cases. In this application the Base and Naphthol are applied in dispersed form at the boil with a carrier, or without a carrier at temperatures around 250 F, and the dyeing is then treated with the necessary concentration of nitrous acid to develop the shade. The conditions of application, such as pH, intermediate rinses and scours, as well as final rinses and scours, depend upon the end use of the polyester, as well as the fiber with which the polyester is blended or will be blended.

Since black is the shade which is most often dyed with azoics, let us consider the dyeing of blacks on polyesters in their various forms and blends.

TOW, TOP, AND STOCK

Dyeing Under Pressure. In this form the material is usually packed tightly and becomes even more tightly packed in the process of dyeing. For this work it is necessary to have the Base and Naphthol in the finest dispersions possible. Cellitazol NSD Extra is a black base of excellent dispersion qualities. We cannot emphasize too strongly that not all prototypes of this color are satisfactory for this type work. The best coupling component for producing an economical black is Naphthol AS-D. Except in certain types of top-dyeing equipment, where the top has been wound so that dye liquor passes through only a small thickness, it is not possible to use regular Naphthol AS-D, as is. This applies to so-called "supra" and "dispersed" brands. To apply this Naphthol in most equipment, it is necessary to dissolve the Naphthol in the conventional way with alcohol and caustic, add it to the kettle and precipitate with an acid such as acetic.

One of the most important factors in obtaining reproducible results with Naphthols is that the dyeing be carried out on the acid side. Such a system of dissolving the Naphthol and reprecipitating leaves much room for error. The use of the naphtholate solution, which contains a given amount of alkali, cuts down this possibility of error to some extent. Considerable polyester fiber has been dyed by this method successfully, but its success depends on the slow and exact addition of acid. We have been able to minimize the chance

of error, to speed up the dyeing time, and to produce cleaner dyeings, however, by the use of Developer AS-D, which is truly a dispersed product. This product can be added together with the dispersed base, which further simplifies the process.

After the Naphthol and Base have been added by one method or another and the pH adjusted properly, the temperature is raised to 240-260 F, and the dyeing run for about one hour.

Rinsing and Intermediate Scouring. In some equipment the bath may simply be dropped and the dyeing rinsed and developed, but in most tow, top, and stock dye equipment it is often desirable to give an intermediate scour. The need for such a scour is far less when dyeing with Developer AS-D than when using the dissolving and precipitating method. Accepted methods call for the use of a small amount of a scouring agent with caustic and hydrosulfite at temperatures around 140 F. Actually, the caustic is the most important factor, since this will solubilize any loose Naphthol, which can then be rinsed out. We have been able to save considerable time in those cases where an intermediate scour has proved necessary, by simply adding a small amount of caustic to the dye bath after it has cooled to 180 F and then running a few minutes before dropping and rinsing.

Developing. This consists of treating with nitrous acid at relatively high temperatures. The amounts of nitrite and acid required are subject to much debate and vary with different types of equipment. The amounts needed should be figured more on the bath concentration than on a percentage of fiber basis. In the liquor ratios of most top and stock machines, 5% nitrite and 10% sulfuric acid are sufficient. Almost any common acid (except sulfamic) is satisfactory for development; and sulfuric, hydrochloric, formic, phosphoric, and acetic are being used in practice. Acetic acid liberates nitrous oxide more gradually than the others and causes less cavitation in closed dye kettles. We generally use sulfuric acid because of its cheapness.

While temperatures as high as 190 F are often recommended, we feel that 170 F is sufficient to develop all shades, if the bath is kept at this temperature for at least 30 minutes.

After Scouring. In certain equipment when the dyeing has been made with Developer AS-D, a scour is unnecessary; however, the sulfuric acid must be neutralized, and this can be accomplished with caustic soda or soda ash.

In cases where the completed dyeing is not clean and where the best fastness is desired, the dyeing should be scoured at 190 F with caustic and hydro and a scouring agent, such as Diazopon SS-837. An even further improvement can be made by scouring under pressure at 220-230 F with caustic and hydro. When scouring under these conditions, the Diazopon and caustic should be added first and hydro sprinkled in after the temperature has reached 190 F.

Dyeing with a Carrier. Dyeings can be made with essentially neutral carriers, such as Tanavol, Carolid, dispersed ortho-phenylphenols, etc., by using Cellitazol NSD Extra and Developer AS-D.

In ball top dyeing it is difficult to dye with a carrier, and there are many reports that when dyeing in this form, it is necessary to use the long procedure of applying the Base with a carrier, scouring, applying beta oxy-naphthoic acid at or near the boil, treating with hot nitrous acid, and scouring. Even in this type dyeing we have been able to produce very satisfactory results with the short procedure, using Cellitazol NSD Extra and Developer AS-D.

Dyeing of Blends of Polyesters. In most cases polyester stock or top is dyed alone and later blended with other fibers; however, it is possible to dye polyester/wool blends and polyester/cellulosic blends with Naphthols.

Polyester/Wool Blends. Polyester/wool blends should be dyed with a carrier, since wool is damaged appreciably when dyeing under pressure at the temperatures necessary for dyeing polyesters without a carrier. The practice of using formaldehyde to prevent wool degradation is not feasible when using Naphthols and Bases. The Cellitazol NSD Extra-Developer AS-D one-bath procedure with an essentially neutral carrier works very well on polyester/wool blends. About 1% monosodium phosphate will establish the pH at 6 to 7. The dyeing is then run for 1 to 1½ hours at the boil, dropped, and rinsed.

An intermediate scour is absolutely essential in polyester/wool dyeing and should be made at 140-150 F with ammonia and hydro. The wool portion must be completely white at this stage, to ensure satisfactory fastness. The development is carried out the same as for 100% polyester, at about 170 F.

There is a slight degradation of the wool fiber in this process, but this is less than would be caused by the prolonged treatments necessary for producing a black on polyesters with dispersed colors. Scouring should again be done with ammonia and hydro at about 150 F. The wool is then dyed conventionally with Chrome Black types.

Polyester/Cellulosic Blends. While the polyester in these blends can be dyed with carriers as outlined for polyester/wool blends, the more common procedure is to dye under pressure and subsequently dye the cellulosic portion with vat dyestuffs. Considerable time can be saved on these blends by dyeing the Naphthol on the polyester under pressure, rinsing, applying the vat color, and then developing the Naphthol and oxidizing the vat color simultaneously with hot nitrous acid.

The scouring at the end must not contain hydro, which we ordinarily use on naphthol-dyed polyester alone.

PACKAGES

100% Polyester. 100% filament polyester goods as well as 100% spun polyester can be dyed with Naphthols by the method outlined for tow, top, and stock. An intermediate caustic-hydro treatment is

desirable, especially in filament dyeing.

Polyester/Cellulosic Blends. Blacks are produced on these blends by dyeing under pressure by the procedure outlined for stock. An intermediate scour is generally used, since the wet fastness and heat fastness requirements of yarn-dyed materials are usually quite severe. The cotton portion is usually dyed with vat colors and viscose with aftertreated direct colors.

Polyester/Wool. Packages of polyester/wool can be dyed by the Naphthol-Chrome Black formulation outlined for stock dyeing. We believe this Naphthol - Chrome formulation is the only way to get a really fast black shade on this blend.

PIECE GOODS

Beck Dyeing. The major part of piece-dye work is beck dyed and requires a carrier. Good blacks are produced on 100% polyester, and on this fiber in polyester/cellulosic blends, with the Cellitazol NSD Extra-Developer AS-D combination. A nonvolatile carrier of the ortho-phenylphenol type is desirable. The best method is to use dispersed carriers with essentially neutral pH values and to adjust the pH with monosodium phosphate. Developer AS-D disperses completely and immediately in hot water, and can be added together with the Cellitazol NSD Extra.

An intermediate scour is not necessary when dyeing Naphthols on the beck, but it is a safety factor when employing the regular type of Naphthol AS-D instead of Developer AS-D. Oftentimes the regular Naphthol AS-D, which is not a truly dispersed product, will settle in the bottom of the beck and become contaminated with carrier or Cellitazol NSD Extra and be deposited on the cloth in development, causing undesirable spots.

Naphthol Blacks can be applied on the jig, using Cellitazol NSD Extra and Developer AS-D and an essentially neutral ortho-phenylphenol-type carrier. In the concentrated volume of the jig it is preferable to use diammonium phosphate to adjust the pH. With this combination of color, carrier, and chemical, we are at a slightly alkaline pH, which will convert to slightly acid with boiling. Rinsing, scouring, developing, and final scouring are carried out as for other type equipment, with the usual adaptations necessary for jig dyeing.

Burlington Beam Pressure Dyeing. Naphthols have proved very successful on this type equipment on those polyester/cotton fabrics which are open enough to allow circulation. Naphthols are very reproducible on such equipment, and the savings over dispersed types in blacks, browns, reds, navies, etc., are substantial, and the time cycle is sometimes shorter. Essentially the same procedure as outlined for packages of polyester/cotton is used.

It is practical to produce blacks on polyester/wool piece goods in the beck and in the Burlington machine with Naphthols. This procedure can only be applied to solid shades, so it has not been exploited to a great extent. It is possible to get a deeper black on polyester goods with Naphthols than can be dyed with conventional disperse dyes. Considerable time can be saved in this Naphthol-wool dye procedure by adding an acid metalized color, such as Palatine Fast Black WANA, to the development bath after the dyeing has been developed and after adding about 1% sulfamic acid to destroy any nitrous oxide that might be left in the bath.

An interesting point about the application of Naphthols to the polyesters, as well as to certain other synthetic fibers, is that it is possible to get reproducible shades of black, brown, rust, dark navy, green, olive, and yellow from the same Naphthol-and-Base combination. While optimum fastness is obtained only with the correct amount of the Base and Naphthol, many of the other shades produced are fast enough, or faster than they are when produced with dispersed colors, and so azoic dyes afford a very economical way of producing these shades.

Naphthol AS-OL gives slightly redder shades of better light fastness in the yellow, olive, and green ranges.

Other Shades. It is possible to produce many shades on the polyesters with Naphthols, but only the blacks, browns, navies, maroons, and reds have been used to a large extent. Most shades are made with Developer AS-D, since this product exhausts well, is relatively cheap, and possesses satisfactory light fastness when coupled with many bases. Beta-oxynaphthoic acid is not compatible with bases that are sensitive to acid and is not fast to light with many bases. Naphthol AS exhausts less than Developer AS-D and is, in general, less fast to light. Naphthol AS-OL is equally as good as Developer AS-D but is more expensive. Other more expensive Naphthols are necessary with certain bases to produce faster-to-light shades.

The most economical browns are made with Cellitazol NSD Extra and controlled amounts of Developer AS-D, navies with Fast Blue B Base Dispersed and Developer AS-D, maroons with Fast Garnet GBC Base Dispersed and Developer AS-D, and reds with Fast Red B Base Dispersed and Developer AS-D or AS-OL.

The navy shade made as above is moderately fast to light, but a definite improvement can be had through the use of 1% Naphthol Assistant LF. This is a product which can be applied as a Naphthol by dissolving in caustic and reprecipitating. It is available also in dispersed form for ease of application. Faster - to - light navy shades are under investigation.

Browns can also be improved in light fastness by the addition of 1% Naphthol Assistant LF. Reds and maroons are satisfactory to light with the above combinations without an assistant.

For stock-dyed or package-dyed shades which must be fast to light and to wet and dry heat, special, more expensive combinations must be selected. In general, Naphthols and Bases which in themselves are colorless when applied to Dacron and other polyesters should be selected. Optimum amounts of the Naphthol and Base must be determined empirically.

Continued on next page

Fast-To-Carrier Cross-Dyeing Shades. By careful selection of Naphthols and proper application it is feasible to produce on polyesters blacks and navies that are fast to practical carrier cross-dyeing on polyester/wool and polyester/cellulosic materials. These fast-to-carrier shades can also be made on polyester/cotton yarn in package equipment. Such dyeings, of course, are not so good to cross-dyeing as is dope-dyed polyester, but they will stand up to most practical cross-dye applications. Further, this offers the possibility of different shade of blacks, as well as navies.

NAPHTHOLS ON OTHER FIBERS

Acrilan Acrylic Fiber. Naphthols may be applied to regular-type Acrilan by approximately the same procedures used for the polyesters, except that no carrier is necessary if temperatures close to the boil can be maintained. In dyeing Acrilan, the Base has relatively more affinity than the Naphthol, as compared to polyesters, and so the proportion of Naphthol to Base should be higher.

Jersey fabrics of 100% Acrilan can be dyed economically and with excellent hand in black, brown, and maroon shades. While reds and navies can be produced, the reds are not appreciably more economical than those produced with cationic dyes and the navies are not fast enough to light except in very heavy depths.

Yarn of 100% Acrilan can be package dyed with Naphthols to the same shade with the cleanest dyeings, best fastness properties, and yarn condition of any class of colors. Dyeing at 220 F ensures best exhaustion of the Naphthol and still retains good condition of the yarn.

Goods of 70% Acrilan/30% viscose can be dyed to black, brown, navy, maroon, olive, and dark green shades very economically with the Naphthols. With exception of the black, there is usually a shade-matching problem involved. This can be handled by adding a small amount of disperse color in conjunction with the direct color used for dyeing the viscose in solid shades. If the dyeing comes up off-shade where the viscose is to be left white, the Acrilan can be brought to shade in the development bath with acid metalized dyes, such as the Palatine colors. An addition of 0.50% to 1% sulfamic acid should be made to the bath to destroy free nitrous oxide before adding the metalized dyes and boiling to shade.

Acrilan 16 and Orlon. Both Acrilan 16 and Orlon have good affinity for most of the Bases but little affinity for the Naphthols and so are not too well suited for Naphthol dyeing. Blends or mixtures of either of these fibers with regular-type Acrilan can be dyed with the Naphthols and some of the cationic types which will stand diazotizing. Of course, in such systems precautions must be taken to prevent precipitation of the anionic and cationic products.

Creslan Acrylic Fiber. Our practical experience is limited in the application of Naphthols to Creslan, but laboratory research and a small amount of practical work indicate that the Naphthols work as well or better on Creslan than on regular-type Acrilan. This application method is similar, no carrier being required.

Combinations of Naphthols and Other Colors. In certain instances it is desirable to combine Naphthols with disperse or cationic dyes, in order to produce a particular shade with the desired fastness properties. The disperse or cationic dyes must stand the hot nitrous acid treatment needed for developing the Naphthols.

A navy blue can be made on polyesters with Cellitazol NSD Extra and Developer AS-D, shaded with Genacron Blue 3R or Genacron Violet BN. A yellow shade of brown can be made with the same naphthol combination shaded with Celliton Fast Yellow 4RL Conc, Celliton Fast Yellow GGLL, or Genacron Yellow 3GL. Dark browns can be brightened and reddened by the use of Genacron Orange RL or Genacron Red B.

The same disperse colors can be combined with Naphthols on the acrylics Acrilan and Creslan. Also on these fibers, as well as on Dacron 64 polyester fiber, certain cationic dyes, such as Genacryl Orange G, Genacryl Pink 3G, and Genacryl Blue 3G, can be combined with the Naphthols.

Special Naphthol Combinations. There are azoic combinations now on the market which simplify the application of this class of color. These products are added directly to the dyebath as a disperse color and need only to be treated with nitrous acid to produce the ultimate shade. Such colors are:

Genacron Developed Black DF
Genacron Developed Black W
Genacron Developed Red K
Genacron Developed Maroon K
Genacron Developed Navy K
Genacron Developed Navy KP
Genacron Developed Dark Brown K

SUMMARY

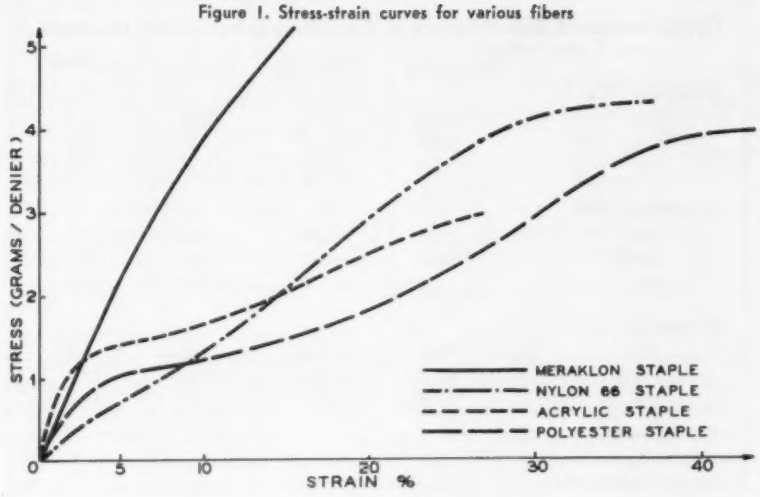
The azoics, either alone or in combination with certain disperse of cationic dyes, offer great possibilities for producing many shades on the newer synthetics economically and with satisfactory fastness properties. In almost every new approach there has been a reluctance by dyers and mill personnel to accept the azoics for dyeing synthetics. Gradually this resistance is fading, and many mills have been able to show substantial savings by the use of azoics on some of the synthetics.

With continued research and plant trials there is no doubt that the azoics will be found applicable to many more synthetic fibers and their blends.

Trademarks

Acrilan—Chemstrand Corp.
Arnel—Celanese Fibers Co.
Carolid—Tanatex Chemical Corp.
Cellitazol—General Aniline & Film Corp.
Creslan—American Cyanamid Co.
Dacron—Du Pont Co.
Darvan—Celanese Fibers Co.
Diazopon—General Aniline & Film Corp.
Genacron—General Aniline & Film Corp.
Orlon—Du Pont Co.
Palatine—General Aniline & Film Corp.
Tanavol—Tanatex Chemical Corp.

Figure 1. Stress-strain curves for various fibers



This newest member of the olefin family of fibers will be heard from more and more in the future. Here are the details on its properties and uses

The Polypropylene Story

by Aldo Fior
Montecatini Co.
Exclusive

RESEARCH carried out by Professor Natta of the Polytechnic Institute of Milan University on stereospecific polymerization of olefins has led to a series of polymers and copolymers which are of great importance because of their properties and the low cost made possible by the availability of raw materials obtained from petroleum processing.

Research done at the Terni Research Institute led to the perfecting, in a relatively short period of time, of one of the most important of these polymers, isotactic polypropylene, which, because of its high degree of crystallinity, is particularly suited for transformation into textile fibers.

In addition, the various problems connected with spinning and finishing of the new fiber have been solved.

A production unit has now started up at Terni with an initial capacity of 12 million lb of staple and filament per year. Plans are already being completed for the stepwise enlargement of this unit to reach a yearly capacity of 60 million lb by 1962. The new fiber, called "Meraklon," is now being launched on the market.

Meraklon is being produced in staple of various deniers and lengths, in tow, top, standard and extra-bulky continuous filament, and in monofilament from a polymer which has a powder-like appearance and melts at a temperature of 347 F.

The spinning of Meraklon is carried out by "melt-spinning" techniques already employed for a series of products, among which the most important are the polyamides and the polyesters.

This spinning system, possible only when the polymers melt at the proper temperatures, is by far the most favorable as far as the costs of transformation and the reproducibility of the results are concerned.

The filaments extruded in the molten state are solidified by simple cooling or, in the case of larger diameter (monofilament), in water. The filaments, however, retain the configuration of the holes in the spinnerette which, in our case, are perfectly circular.

The yarns thus obtained are subjected to a cycle of so-called "finishing" operations, of which the most important are drawing and thermal stabilization. Both of these operations have a determining effect on the final behavior of the products and combine, together with the properties of the polymers used, to make possible the variations so important for various textile applications.

Mechanical Properties of the Fibers. In *Figure 1* is shown a stress-strain curve for one type of Meraklon fiber in comparison with several other well-known fibers. From an examination of these curves, it is possible to deduce a number of data on the most important mechanical properties. These curves were obtained in the Terni Research Institute, working with an Instron dynamometer on samples 5 cm long and at a speed of strain of 3 cm per minute, according to ASTM standard D76/53, at a temperature of 68 F and at 65% relative humidity.

The various types of polypropylene fibers produced give different curves, depending on the properties of the polymers employed and on the finishing cycles adopted; we have chosen, for this diagram, a

type of staple which has mechanical properties intermediate between the fiber for wool applications (high elongation) and that for cotton applications (high tensile strength). The comparison was made with analogous samples of other fibers.

We examined in the same way the tensile strength, or resistance to breaking, even though this property is not now considered, as it used to be, as an all-important factor. A fiber, in fact, may have high tensile strength without for this reason being a good fiber.

The tensile strength of the fiber under examination proved to be 6 gr/den. In laboratory tests, we have even succeeded in reaching breaking loads of 9 gr/den.

The breaking elongation, which represents the maximum elongation the fiber will assume before breaking, and which is expressed in per cent of the initial length of the fiber, is in this case 18%.

The continuous filament and monofilament have analogous values (15-25%). On the other hand, the wool-type staple has a value oscillating between 25% and 30%. The elongation of the cotton-type staple is 20-25%. The breaking elongation has a varying effect on the characterization of a fiber.

Fibers with high tensile strength not accompanied by high elongation, as in the case of glass fibers, run into severe limitations in their textile applications. Elongation, in conjunction with behavior under repeated stresses (below breaking load), has an influence on important properties such as resilience, crease retention, and abrasion resistance of the finished product.

Since textile fibers in general do not obey Hooke's Law, and therefore do not exhibit direct proportionality between stress and deformation, Young's modulus is not constant for the same fiber. For this reason, to be definitive, we should limit ourselves to a particular portion of the curve in question. It is preferable to calculate Young's modulus on the basis of the slope of the curve in its initial portion, since this section is the most interesting for textile applications.

The elastic modulus is of great use, above all in the study of mixtures of fibers, since it permits an evaluation of the way in which the fiber under study participates in the absorption of stresses in a thread or in a piece of manufactured goods. The stresses, in fact, concentrate in the threads of that fiber having the greatest modulus of elasticity.

The modulus of elasticity of polypropylene fiber represented in the curve is 65 gr/den. This value can vary over a wide range from 30 to 75 gr/den.

The average "work absorption" is expressed in grams per denier, and is calculated by multiplying half of the breaking load by the breaking elongation in per cent divided by 100. This parameter represents the ability of a fiber to absorb energy when it is deformed and, together with the capacity to return to its original dimensions when the load is removed, is of extreme importance in a consideration of the properties of manufactured goods, such as pleat retention, abrasion and wear resistance, form retention, resilience, and hand. The value taken from the curve in question is 0.44 gr/den. In different types of fiber, the value varies between 0.63 and 0.13 gr/den.

From this initial study, it can be concluded that polypropylene fibers have a more than satisfactory mechanical behavior, which is, on the whole, not inferior to those of the best fibers presently being produced.

TABLE 1. Fiber Elastic Recovery as Percentage of Imposed Deformation

	Meraklon	Nylon 66	Acrylic	Polyester
Elongation 5%				
IER	38.4	17.2	20.8	14.8
DER	61.6	82.8	73.7	75.6
PS	0.0	0.0	5.5	9.6
Elongation 10%				
IER	29.4	14.7	11.8	10.8
DER	64.2	79.9	56.4	59.8
PS	6.4	5.4	31.8	29.4
Elongation 15%				
IER	27.5	14.4	9.2	8.3
DER	61.7	71.0	49.0	49.2
PS	10.8	14.6	41.8	42.5

IER—Immediate Elastic Recovery
DER—Delayed Elastic Recovery
PS—Permanent Set

Elastic Behavior. We have just presented an over-all review of the way Meraklon reacts to the stresses to which it is subjected. This sort of behavior is doubtless very important in a fiber; but perhaps still more important is how it reacts to deformations. During its life, a piece of textile goods in most cases must yield to imposed forces by assuming corresponding deformations. When we squeeze a fabric in our fist, it should deform itself with a slight resistance (suppleness), and then should immediately jump back to its extended position when we open our hand.

The deformations undergone by the filaments during this operation have been discussed at length by various research workers who have been interested by this property. These deformations depend on a large number of factors: diameter of the filament, length, diameter of the yarn, twist, the warp and filling of the fabric or the fineness of the knit, friction between filament and filament, and the presence of sizing, to mention only the most important.

Most of the authors report values for these deformations within the interval between 2 and -8%, the lower values referring to more supple and voluminous fabrics, the higher to more compact fabrics. It is therefore of great importance to examine the behavior of the fibers under these deformations.

A series of measurements with

the Instron has been carried out, applying to the various fibers elongations of 5-10-15% and studying the immediate recovery (IER), that is, the recovery which takes place immediately at the moment when the load is removed; the delayed recovery (DER) which takes place in the next five minutes; and the residual deformation (RD).

Table 1 reports the results obtained.

We have already had occasion to note how fibers subjected to stresses, up to the point where they reach the elongation shown in the preceding table, do not act as perfectly elastic bodies, but exhibit a running effect or creep. It becomes important, therefore, to define the phenomenon more precisely by subjecting the fibers to a stress for a prolonged period. The results of such study, in which the fibers were held for 24 hours under loads of 0.5, 1, and 1.5 gr/den indicate that polypropylene is intermediate between polyamide and acrylonitrile fibers, which are considered more than satisfactory in regard to these factors, and are reflected in the dimensional stability of the manufactured goods.

Up to the present, in talking of the forces to which the fibers are subjected, we have considered only the stresses; however, fibers and manufactured goods are also called upon to react to demands and deformations different from those obtained by traction. Of these, the most important are flexing and torsion, since, because of the high ratio between length and diameter, the fibers are not adapted to resist any kind of compression force.

Cutting forces are not considered very important by textile mills; these are of interest particularly to fiber producers because of the problems which arise in the operation of cutting the tow for the production of fibers.

The way in which fabrics vary in draping properties, resistance to wrinkling, suppleness, and hand, depends on a large number of factors having to do with the constitution of the fabrics, and also with the intrinsic properties of the filaments. Among these properties the most important is flexibility, which is closely linked to the diameter of the filament and can be easily modified in the spinning and finishing processes. We have also taken into consideration the resistance of the fiber to repeated flexing, following the methods most commonly described in the literature. The test was made with an apparatus in which the filament, loaded with a one-gram weight, is flexed to an angle of 175° at a velocity of 400 flexings per minute.

TABLE 2. Resistance to Flexing and Torsion

	Flexing	Torsion
Polypropylene	200,000	31° 34′
Nylon	380,000	25° 13′
Acrylic	316,000	55° 30′
Polyester	170,000	33° 19′
Wool	44,000	—
Silk	5,000	—
Rayon	2,500	—

The results are shown in *Table 2*, which also shows a comparison with the other fibers. It can be noted that, in this respect, polypropylene fiber is intermediate between polyamide and polyester fibers.

The resistance to torsion is of interest in the production of high-twist yarn and for the properties of the manufactured goods made from it. This resistance is determined by subjecting a filament to torsion up to the breaking point, and measuring the maximum angle of the screw which the fiber can stand before breaking. The results reported in *Table 2* show that our fiber is on the same level as polyamide and polyester fibers.

Dimensional Stability. The behavior of the various fibers after a one-half hour treatment in air at 212 F and 266 F, and in water at 212 F, has been studied, taking into account the shrinking which takes place in the fibers. The results of these tests are reported in *Table 3*. The polypropylene fibers have the same stability as polyester fibers, which are judged more than satisfactory.

Effect of Chemicals. Polypropylene fibers resist strong acids well, and weak acids very well. Resistance to both strong and weak bases is good.

Polypropylene fibers are insoluble, hot or cold, in many organic solvents; for example, alcohol, acetone, carbon disulfide, etc. They are soluble in high-boiling chlorinated solvents. They resist, without damage, dry cleaning treatments with solvents ordinarily employed; for example, trichloroethylene.

Polypropylene fibers resist ordinary bleaching treatments well and like other synthetic fibers, they have excellent resistance to molds, micro-organisms, and insects. *Table 4* (p. 108) summarizes the behavior of polypropylene fibers in various chemical reagents.

Dyeability. Initially Meraklon is being produced in dull white and in the solution dyed form, in various colors with excellent fastness to various agents.

Research on dyeing has led to several different modifications of the polymer, to make the fiber dyeable with acid, chrome, and pre-metalized dyestuffs. Several types of such modified fibers are already in pilot-plant production.

Properties of Manufactured Goods. Thus we conclude our overall examination of the intrinsic properties of polypropylene fibers, that is, the properties which can be evaluated by laboratory tests. Let us now pass briefly in review the properties which are encountered in manufacturing. These are much more important if we con-

TABLE 3. Dimensional Stability in Water and Air

	Shrinkage, %			
	Meraklon	Nylon 66	Acrylic	Polyester
½ hr underwater at 212 F	0.0	0.0	0.0	0.0
½ hr in air at 212 F	0.0	0.0	0.0	0.0
½ hr in air at 265 F	2.5	1.4	0.5	2.5

TABLE 4. Resistance of Meraklon to Chemicals

	Conc %	RT[1] %
Acids at 68 F		
Hydrochloric	34	100
Nitric	66	100
Sulfuric	94	100
Formic	75	100
Acetic, glacial		100
Alkalies		
Potassium hydroxide	40	90
Sodium hydroxide	40	90
Solvents		
Trichloroethylene		80
Perchlorocthylene		80
Toluene		85
Benzene		80
Oxidizing Agents at 68 F		
Sodium hypochlorite (active Cl 5%)		85
Hydrogen peroxide, 12 vol		90

CHEMICAL AGENTS AT 158 F	RT, %	
	6 hr	24 hr
Sulfuric acid 94%	100	95
Acetic acid, glacial	100	95
Sodium hydroxide 40%	100	95
Potassium hydrate 40%	100	95
Sodium hypochlorite (Active Cl 0.25%)	100	95

[1]RT—Residual Tenacity (after four days unless otherwise indicated)

sider the fibers as intermediates used in the transformation into useful articles.

While the evaluation of a fiber, however laborious, can for most of the qualities be carried out with instruments which give reproducible and predictable values, insurmountable difficulties are often encountered when we come up against the evaluation of many qualities which interest the manufacturer, based for the most part on subjective criteria such as the sensations of observers.

However, conscious of the great importance of these tests, which are definitive since they reflect the possibility of market acceptance for any new fiber, we have undertaken the most thorough studies.

Processing Behavior. A property of polypropylene fibers evident from the very beginning has been the facility with which they can be worked in the various pure or mixed fabrication cycles with other fibers.

In either wool or cotton-type spinning systems there are obtained workability and production yields equal to those for wool and almost equal to those for cotton. In weaving or knitting there are obtained rates of production and machine yields higher than those obtainable with natural fibers. We believe this exceptional behavior is due to coefficients of friction, both static and dynamic, between filament and filament, which are higher than those of other synthetic fibers and which are close to those of wool, and to the excellent mechanical and elastic properties of the fiber. In addition, from the operations carried out up to now, it appears that the sensitivity of the fiber to electrostatic loads, with the use of antistatic finishes, is less than that commonly encountered with the other synthetic fibers.

Covering Power. The low specific gravity of the new fiber (0.91), in comparison with that of the other fibers—rayon and cotton 1.5, wool 1.34, polyester 1.38, acrylonitrile 1.17, polyamide 1.14—is reflected in manufactured goods and leads to a lowering of their weight per square yard, almost directly proportional to the quantity of polypropylene fiber present; the same holds for all the other properties. This is above all a virtue of an economic character because of the lower cost of the raw material used in the fabrics, and the advantages of quality because of the greater lightness of the manufactured goods.

All of the tests carried out have confirmed this property in all the applications examined, in 100% and blended fabrics. As an example, results obtained on poplin-type fabrics of equal properties can be cited:

Pure cotton poplin gave a weight of 3.8 oz/sq yd; the same type of poplin made with a mixture of 75% cotton, 25% polypropylene, gave 3.5 oz/sq yd; the same with 50% cotton, 50% polypropylene gave 3.1 oz/sq yd; the same with 25% cotton, 75% polypropylene, gave 2.7 oz/sq yd; and pure polypropylene gave 2.4 oz/sq yd.

Completely analogous results were obtained in mixtures with wool and in 100% polypropylene wool-types.

Polypropylene fiber is by far the lightest of all the synthetic or natural fibers which exist today.

Insulating Power of the Fabrics. The insulating value of fabrics is as important as it is difficult to evaluate. First of all, it is necessary to make a distinction between true thermal conductivity and the sense of warmth felt by a human being. In regard to the first, it must be noted that this depends more on the properties of the fabric and to a much lesser degree on the nature of the fiber. More than the fiber itself, it is the air held within the fabric which imparts the insulating action. To avoid, or better, to reduce this undesirable factor, we have carried out measurements by a method which permits satisfactory reproducibility and which gives a certain evaluation without the intervention of interfering factors within the fabrics.

This method, as we have said, gives reproducible results but, at the same time, has only a relative character. The test consists in filling with adequately compressed staple as much as possible the space existing between two cylinders, the inside one containing water at 158 F (70 C), and the outer one circulating cooling water; from this there is determined the drop in temperature as a function of time down to a value of 140 F (60 C). Finally, there are recorded in graphic form the logarithmic values of the difference between the temperature of the water in the cylinder and that of the water in the jacket, as a function of time. As a measure of the insulating power, in the interval 140-158 F, we take the reciprocal, with the sign changed, of the slope of the resulting straight line on the graph.

Comparing polypropylene fiber with Australian wool, we obtained: For the former, a value of 3.2×10^4; for the latter 2.7×10^4 sec/log t, which means a higher insulating power for the polypropylene.

The sense of warmth felt by a human being is a property into which enter, besides true thermal conductivity, numerous other factors—physical, physiological, and even psychic. There enters here the concept of comfort, that is, the more or less pleasant sensation one has upon donning a garment. Other factors also come into play—permeability to air, transmission of humidity, and the weight of the garment.

We have distributed many garments, and have collected and recorded opinions; the result of this sounding has been very satisfactory. The extreme lightness, the good air permeability, and the transmission of humidity resulting from the low absorption of the fiber have contributed to create a very favorable comfort rating.

Resistance to Wrinkling. Resistance to wrinkling is understood as the tendency of a textile to reassume its form after the deformation which it undergoes during use. This action can take place immediately when the cause of the deformation is removed, or slowly with time. The speed and completeness of the recovery give the measurement of the wrinkle resistance. This is a property closely linked with the structure of the fabric and with the finishing technique adopted. It can be evaluated with sufficient reproducibility by several different testing methods.

We have followed the TBL method, and have carried out tests on fabrics of pure polypropylene and mixtures with cotton and wool, compared with fabrics of the same structure of pure cotton and wool.

The method consists in folding in two a strip of fabric (4 cm x 1 cm) and placing it under a weight of 500 grams for 5 minutes. Three minutes after removal of the weight, the residual angle is measured between the two faces of the fabric which were placed in contact. The nearer this angle comes to 180° (as it was before the operation) the better is the wrinkle resistance.

These tests showed that in the mixtures with cotton the polypropylene fibers brought about an appreciable improvement, even more marked if pure cotton fabrics are compared with those of pure polypropylene.

We have the following average values for the angle of recovery: pure polypropylene, 110°; 50-50% mixtures, 80°; pure cotton, 65°. These values were obtained on a series of poplin-type fabrics without application of antiwrinkle treatments.

Compared to wool, a fiber with excellent wrinkle resistance, no appreciable difference was noted, between either the pure or mixed types. The angles of recovery varied between 110° and 120°, according to the type of fabric.

Resistance to Ironing. The highest temperatures to which a manufactured fabric is subjected, except in rare and exceptional cases, are those of pressing irons. Therefore, where ironing is required, the observance of safety limits in applying the iron is of great importance.

Fabrics made of pure and mixed polypropylene must be ironed with a damp cloth placed between the iron and the fabric, with a steam iron, or with an iron at controlled temperature, thus observing the common precautions generally used with garments made of synthetic fibers.

It should be noted, however, that given the high wrinkle resistance, all knitted and many woven garments do not need to be ironed.

Dimensional Stability. This property, which is connected with the ability of a piece of manufactured goods to preserve its original dimensions unaltered during use and the various treatments which this implies such as wet washing, dry cleaning, and temperature effects has been investigated by usage tests and treatment tests. Whether in wool or cotton mixtures, as with pure polypropylene, we have obtained results in the same order of magnitude as those obtained with analogous pure cotton and wool fabrics.

In the poplins we have encountered shrinkages, on exposures to air at temperatures from 140 F and 212 F from 0.3 to 1%, respectively, on filling and warp in all cases; shrinkage upon dry cleaning in trichloroethylene of 1% in all cases.

In fabrics mixed with wool for men's wear, the shrinkages varied between 0 and 2% in air at 140 F and 212 F, and between 1.5 and 3% in dry cleaning for the various mixtures and for the two pure fabrics.

The wear tests, carried out on garments distributed about a year ago, have not yet exhibited any appreciable deformation.

Abrasion and Wear Resistance. Abrasion resistance can be measured by laboratory tests either on the fiber or on the manufactured goods. The literature describes various testing methods, with several abrasives, under a variety of loads, and at different velocities. The results obtained can be useful for the comparison of equivalent samples in an approximate manner, but they do not permit an exact evaluation of the behavior of a garment under the abrasion to which it will be subjected during its life. For this purpose wear tests are without doubt the most convincing.

Tests carried out on filaments subjected to the abrasive action of a rotating cylinder show behavior between that of polyamide and acrylonitrile fibers.

Tests carried out on fabrics for abrasion between fabric and fabric on a standard flat-plate Usometer showed, after 7,000 revolutions of the plate under a load of 4 kilograms, the results summarized in *Table 5* (p. 110), for pure fabrics and those mixed with wool or cotton.

The wear tests which we carried out on garments which have been distributed have not produced any unfavorable data in this respect. The wear resistance of a fabric taken as a whole, however, goes far beyond simple resistance to abrasion which is only one aspect of this most important problem. Other factors come into play. First of all (to mention the most important) we should cite the wrinkle resistance and the dimensional stability of which we have already spoken as well as pilling, dirt resistance, and ease of washing.

Hand and Draping Properties. We enter here the most complex and the most discussed field in the properties of a fabric, where judgments are subjective and are expressed by words whose mean-

TABLE 5. Resistance to Tearing

Type of fabric	Before Abrasion Test		After Abrasion Test		Loss in Weight During Abrasion
	kg	mm	kg	mm	%
Pure polypropylene (wool-like)	18	11.4	15.4	11.0	1.49
Mixed with wool 50/50	15	12.0	13.5	11.5	1.25
Pure wool	10	14.9	8.0	13.0	1.13
Pure polypropylene (cotton-like)	17.0	12.0	15.4	11.2	
Mixed with cotton 50/50	11.0	9.0	7.0	7.2	
Pure cotton	8.5	7.0	5.6	7.0	

ings are not always well defined. These judgments are opinions which are valid for a given fabric and in which the fibers play a secondary role. There enter here the skill of the weaver and, still more, that of the textile finisher.

We have, therefore, left this judgment to experts in these fields, a judgment which has been very favorable and attractive, especially for certain applications.

Textile Applications. Work carried out to date in the field of textile applications, although far from completed, has nevertheless permitted an initial evaluation of prospects open to Meraklon for various end uses. These can be summed up as follows:

WOOLEN SYSTEMS:

1—Uses of 100% Meraklon

a) Carpets and rugs—for abrasion resistance, resistance to moths and molds, absence of pilling, ease of washing and drying, fastness of the colors, and lightness, in addition to economic and cost reasons.

b) Upholstery fabrics for interiors, furniture, automobiles, airplanes, ships, trains etc., for the same reasons listed in connection with carpets and rugs.

c) Blankets of all dimensions because of the reasons already mentioned in addition to lightness, suppleness, and warmth.

d) Heavy apparel for men and even more for women, since, by using the lightness of the fiber to its best advantage, it is possible to obtain fabrics of particular value for bulk and, above all, for lightness.

2—Uses of Meraklon in blends with wool:

a) Various types of fabrics in which Meraklon is used to increase resistance and to avoid felting, in percentages of 10% or less.

b) Knitted goods for outer wear. In this field excellent results have been obtained with percentages varying up to 70%.

c) Textiles with up to 30% Meraklon and waste wool. The fabrics have good hand, draping properties, and improved resistance to wear.

d) Fabrics with higher percentages of Meraklon (from 30 to 90%) which are studied from time to time according to the properties desired. As an example, we might mention that pleated fabrics have been made from a mixture of 60% Meraklon and 40% wool.

WOOLS—WORSTED:

The most interesting results have been obtained in mixtures with wool, in particular in the "tropical"-type fabrics, where the function of Meraklon is to increase lightness and wear resistance of the fabrics. The best mixtures have been obtained with 30-40% Meraklon.

Excellent results have been obtained by adding the new fiber as a reinforcement in percentages of 10% or less.

Tests with knitted fabrics, both for under and outer wear, in which Meraklon has been used in mixtures with wool varying up to 70%, have also yielded good results.

INDUSTRIAL APPLICATIONS:

Meraklon has proved to be particularly fit for use in industrial fabrics, for which, in the majority of cases, it has been employed in the pure form. Among industrial applications, the following show real promise:

a) Filter cloths

b) Oil, seed, and press filters

c) Ropes

d) Paper maker's felts (wool blends)

e) Work clothes

Other industrial applications are being explored.

COTTONS:

Research has been done on fabrics of 100% Meraklon, and fabrics mixed with cotton and rayon. The chief advantages resulting from the use of Meraklon can be summed up as follows:

Greater lightness of the manufactured goods

Better mechanical and elastic properties

Greater insulating power and sense of comfort

Increased wrinkle resistance

Ease of washing and drying

Resistance to mold and humidity

Absence of deformation from washing

BULKY CONTINUOUS FILAMENT:

Recently, a particular type of bulked continuous filament has been perfected. With this interesting yarn, fabrics with excellent properties have been obtained in the field of underwear, knitted outerwear, and gloves.

STANDARD CONTINUOUS FILAMENT:

In this field, the first manufacturing tests are under way. For the moment they are being tried with industrial fabrics, women's underwear, draperies, and other uses.

They've hastened the arrival of the "engineered-for-use" fabric

The Impact of Textured Yarns

by Robert K. Stanley
Director, Research and Development
Textured Yarn Co.

Exclusive

WHEN WE wish to make evaluation of a trend, it is usually helpful to study history. We may then be better prepared to examine the events of today, relate them to the past, and project possibilities for the future. We now wish to consider what effect textured yarns are having and are likely to have upon the textile industry.

In man's early efforts to clothe himself he had either to use the skins of animals or of naturally occurring fibers, such as those obtained from animals—wool and wool-like fibers, fur and hair, and silk—and the other naturally occurring fibers made of cellulose—cotton, and in some relatively few cases, flax. All of these fibers have their own special attributes, combining in varying degrees the properties of bulk, warmth, moisture, absorbency, luster, tensile strength, and processability. However, within the last fifty years we have seen a tremendous change from the earlier concept of what a textile fiber is and what it will do.

The earliest attempts of man to produce a fiber for himself were geared to the idea of making cheaper materials appear like the more expensive natural fibers; i. e., to perform the functions of those fibers. To some extent, these man-made fibers were not measured against standards of ideal fiber for a given use and for their intrinsic performance, but against the standards set by silk or wool.

Many of the earlier patents which were obtained for the new fibers and processes of manufacture specifically stated that the desire was to make a more silk-like fiber or a more wool-like fiber. Many processes were also geared to the attempt to modify the man-made fiber so that it would perform in its workability more like the older, well-known naturally occurring fibers. It is equally well known that many of the texturing processes with which we are working today were intended originally not to be the means for modifying a fiber to produce new and desirable attributes, but to modify a fiber so that it would perform during processing through the mill or when in use in the final garment more as a natural fiber to which man was accustomed.

True, there were other attributes of these fibers which were taken into account, such as the higher tensile strength and abrasion resistance of nylon, but these were plus values toward the achievement of a better garment and were seldom exploited strictly for what they were—a new opportunity in design. Even today we may describe nylon as having a wool-like feel, Orlon as having a cashmere-like feel, or a silky hand. Certainly, no one can say that this is not proper, inasmuch as we all have a similar concept, based on years of use, of what these terms mean, and probably these terms are universally recognized as having something of the same meaning to most people.

More recently, however, textured yarns have been looked upon as a new tool—a means for producing effects which were previously unattainable and for the creation of classes of goods which for utility and style could never have been achieved with the natural fibers nor with the earlier attempts to produce man-made fibers of similar character to the natural fibers. In the short space of ten years, we have seen stretch hosiery appear and assume a place in the market which will unquestionably be maintained at a very considerable level throughout the foreseeable future. An interesting sidelight to this, of course, is that mother and grandmother have been able to throw away the darning needle.

The next major achievement of the newer textured yarns was their introduction into the knitted outerwear field, where they achieved considerable importance. A style of garment could be produced which previously had been difficult, if not impossible, to obtain with the older fibers. Gradually, other clothing fields are being invaded and also within the last two years we have seen a major trend toward the incorporation of textured yarns into the home furnishings market.

What Is "Textured"? Wherever textiles go, very likely textured yarns will go also, but now the very real question arises "what are textured yarns?" So far, the words "textured yarns" have been used without any definition of what was meant by the term. The following definition for the purposes of this paper, unquestionably will cause some people to take issue and will undoubtedly create some dissatisfaction because it may be quite inadequate to cover things which others may have in mind.

This is the sixth in a series of articles covering the various types of textured yarns. The others, with the pages on which they appeared in TEXTILE INDUSTRIES, are: "Stretch Yarn," August, 1959, 102-105; "Taslan Textured Yarns," March, 1960, 84-89, 107; "Saaba Textured Yarn," May, 1960, 192-193, 298, 300; "Spunize Textured Yarn," June, 1960, 91-92; "Economics of Textured Yarns," this issue, 93, 114-116. The next article in the series will appear in an early issue.

The definition is this: *A textured yarn is one in which the fiber or fibers making up that yarn have been disturbed from their usual straight-line or low-order helical formation about the central axis.*

Therefore, textured yarns will include fancy twist yarns, and all others which have been mechanically disturbed by air-jet, overtwisting, false twisting, stuffer crimping, edge crimping, gear crimping, or any other distortions which may be accomplished by the application of force, either from within or from outside the yarn or fiber.

Several ways of texturing yarn have been mentioned above quite casually as no lengthy discussion of process is contemplated. There have been several excellent articles appearing in this magazine recently which discussed processing in detail and these discussions were highly descriptive of the attributes of the fiber after processing.

Impact on the Consumer. This thesis, however, concerns the impact of textured yarns on the textile industry, and not only on the textile industry, but upon the textile consumer. This poor consumer is today being beset from all sides by new fibers and new processes with trade names for these fibers and processes. The claims of many attributes for both the fibers and the processes surely are not only bewildering but very confusing. For the consumer to find his way amidst the claims and counter-claims is, to say the least, difficult. If this same poor consumer would suddenly revolt and decide he was going back to natural fibers in a return to the "good old days" it would be somewhat understandable.

The forest of new fibers and new processes is an uncharted wilderness, and the many "miracles" that have been performed in this area are enough to confuse even the textile technologist. There are already known today about 150 trade names for fibers which have appeared in the market during the last few years, as well as ten or a dozen texturing processes, and new ones are being promoted every day.

What then is our impact on the consumer? It must be confusion worse confounded, because fiber and process do not always go together, because not every process is suitable for every fiber, and certainly many combinations are unsuitable for any given end use.

Textured yarns are unquestionably here to stay, because they make desirable products. There is no doubt that most of the processes known today will continue to be used and there will be new methods to fill voids which have been left because a given process does not satisfy a need in a particular segment of industry.

Each fiber manufacturer is trying to perform a service for the public, as is each processor of textured yarn. As a matter of fact, the importance of textured yarns has became so well recognized that the basic fiber manufacturer has entered this field in a big way. Fiber manufacturers can, of course, perform a tremendous service where the texturing process can become a part of the production of the fiber, but many processes do not lend themselves to this technique.

We can expect that the texturization will continue to be performed by throwsters for some time to come, because of the flexibility they have in the use of fiber and process. Perhaps the greatest service that any texturizer can perform is to see to it that the yarns he offers for any end use are the most adaptable for that end use, and that they will perform the desired function to the best advantage.

No fiber, no process should be forced into a usage where the particular physical properties of that fiber and process do not meet the most desirable requirement, "engineered for the customer."

From all this discussion, it would seem that we have the following to learn: In the history of man's efforts to clothe himself, he has tried to employ naturally occurring fibers, using many techniques to obtain the greatest utility or the highest degree of adornment, or a combination of these attributes. The advent of man-made fibers marked the attempt to perform these functions more efficiently or more cheaply.

In every case where fiber is used or is created to be used for a specific purpose, and fails either in utility or adornment, it may drop from that particular end use or may drop from the market entirely.

Certainly, no one would say that textured yarns have failed to create more useful and/or more beautiful textile articles.

Engineering With Textured Yarns. For us in the textile industry to best serve our function, which is the creation of textiles, we must examine first the requirements of the end-use; second, the available fibers and processing methods; then try intelligently to pre-select the proper combination. Perhaps a few examples of preassessment of the needs of the consumer by the stylist and the fabric manufacturer may serve to illustrate the point.

In the sweater field, some five years ago, the need for lighter-weight fabrics that would not pill, fuzz, shrink, or stretch, was quite apparent. The textured yarns of the early fifties, based on methods of twisting or false-twisting, gave too springy a fabric with the style-wise negative effect of a pebbly surface. Here yarns with a random crimp based on sharp bends rather than helical coils ansuered the need.

The use of the same random crimp yarns in men's hose was rather less successful, as the tendency of the heel portion of the sock to creep during wear was all too apparent. The use of helical coil yarns, however, gave too grainy an effect. Here the obvious answer was to impart the elasticity of the coil yarn to the softer random crimp yarn, and a better consumer product was given to the public.

Now another example of proper engineering of fabric from proper yarns for best consumer service: Surely everyone can remember the parachute-cloth synthetic shirts of the early fifties that gave fabrics of man-made yarns such a bad reputation that the word "nylon" in sheer fabrics came to meet with immediate consumer resistance. More recently, nylon, polyester yarns, and acrylic yarns, modified by various techniques,

have all but washed this memory from the consumer's mind.

Now turn to the home furnishings field, where sheer nylon curtains fell apart from sunlight; spun nylon carpets fuzzed and matted, and showed soil from very light traffic; where upholstery fabrics picked and fuzzed and were virtually destroyed by pulled threads. Curtains and drapes are now made from textured, sunlight resistant yarns; carpets from continuous filament textured yarns, with engineered cross sections for greatest liveliness, covering power, and soil resistance; while upholstery fabrics now resist pilling and fuzzing, and cover so well that a snagged end may be clipped off and the fabric will still retain its beauty.

The manufacturers of nylon filament have imparted latent texture characteristics to some sizes of yarns so that these may subsequently be developed in finishing processes. Certain acrylics are also being given texture attributes by their manufacturers and this is also the case with rayon.

Beyond this texturing at the source of the fiber, the throwsters have been very busy modifying processes so that yarns may be stabilized to the end that fabric characteristics may be more desirable.

It would then seem that textured yarns have caused the fiber manufacturer to become more textile minded, to expand from the realm of chemical technology into the area of textile technology. In many cases he has brought to the textile field objective thinking about age-old machines and methods.

In turn, the textile yarn manufacturer has taken it upon himself to initiate and pursue research into the chemical and physical nature of fibers so that he can best use the tools placed in his hands.

The fabric manufacturer has sought to learn more ways of combining fibers and textures to achieve the more desirable effects. This process cannot stop or some new, more adaptable material will take over the markets now enjoyed by the textured yarn producer.

We must therefore conclude that textured yarns have accelerated the use of technology from other industries and services in textiles; they have caused the textile manufacturer to institute better quality control programs; they have triggered more "hard sell" to the consumer.

Most of all they have given rise to "engineered-for-use" fabrics. They have caused the textile industry to look at the needs of the consumer so that he may fit his product to that need.

Silk-Like Fabrics *(from page 98)*

of Antron are processed conventionally, but of course, without tension. The sequence of finishing operations for the printed fabric include the following:

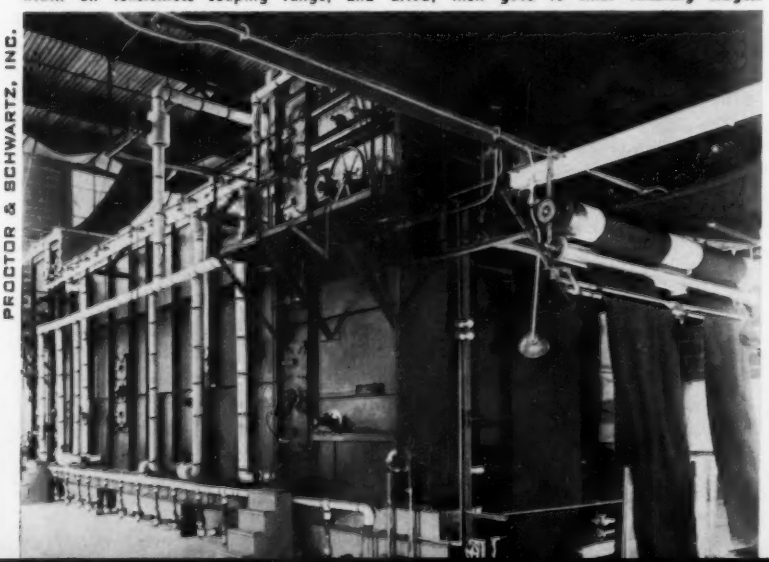
Boil-off in beck, followed by drying in a loop dryer.

Printing with acid colors, which are selected for brightness, washability, and light fastness. A more exacting engraving technique is required to get desired sharp prints.

Rapid aging in a loop ager, followed by open width, tension-free soaping and drying.

Finishing, which includes the application of an antistatic agent and heat-setting.

Stafford Printers recently installed loop ager like this. Here too the fabric is processed under relaxed conditions. Cationic colors are either rapid-aged or given a cottage steaming; acid colors are rapid aged. After color fixation, fabric is processed in open width on tensionless soaping range, and dried; then goes to final finishing stages.



PROCTOR & SCHWARTZ, INC.

SUMMARY

The uniqueness of silk, as this article has tried to emphasize, can be attributed to inherent aesthetic properties. In finishing, the goal is to preserve these inherent properties, largely through relaxed processing, rather than to modify them. Not unlike other natural fibers, silk is lacking in several characteristics, such as washability and color fastness, which are important to consumer satisfaction. Thus, any effort toward developing a fiber with "silk-like" properties must also provide some desirable properties not supplied by nature.

Dacron Type 62 polyester fiber, a modified-cross-section filament yarn, and Antron tri-lobal multifilament nylon yarn, are developments towards this end. Their nonround cross sections impart irregular and more silk-like luster to fabrics, providing greater cover and a more pleasing, non-synthetic hand. They offer, besides, washability and color fastness.

No doubt these two fiber developments do not represent final research efforts toward simulating silk. It is noteworthy to point out, however, that like silk they require essentially the same care in finishing.

Dollars and Cents *(from page 93)*

ventional method as early as 1956.

More recently, with improved higher-speed spindles, production increases up to seven times current production were possible. This did not occur; production in the last 12 months before the 1959 slump in stretch yarns only doubled and did not come close to reaching its total potential. It should be noted further that all licensees have not adopted the new machinery, since, in addition to adverse business conditions, there were reports that yarn made on the high-speed spindles was not up to the quality of the slower production units.

As regards the stuffer-box methods, the number of boxes is estimated at 10,000 in 1955 and 35,000 in 1959. This was spread over 15 active licensees in 1955 and close to 25 in the U. S. and Canada four years later. The production of a false-twist spindle is different from that of a stuffer-box unit. The stuffer-box units have today about four times the production, yet the cost per unit of crimping vs twisting is materially higher. This especially applies to low-denier yarns. As the yards per pound increase, the cost differential becomes less.

Some of today's licensees operate under both the stretch and Textralized (stuffer-box) patents but, in the past, the majority chose one or the other. In general the throwster selected the stretch, the spinner and large vertical mill the Textralized. Five large vertical mills also use the stretch methods.

Production. Prior to 1955, production figures on both the Textralized and stretch-yarn processes were somewhat indefinite. No surveys were made and little statistical data existed. The following figures in terms of 100,000 lb units are again closely approximate and yet show interesting trends:

	1955	1959
Conventional stretch	20	2
False twist	170	350
Bulk—Textralized	45	250
Taslan	4	50
Agilon	1	3

These figures are estimates based on the best information available from machinery manufacturers, trade magazines, and yarn processors. They show that stretch yarns are still the volume textured yarn but the gap between the stretch and the stuffer box and aeration (Taslan) methods is rapidly closing. Also, as will be described later, the textured yarns as manufactured by the producer are rapidly making inroads in the heavier deniers. These are not included, since until recently neither the stretch nor the Textralized processes attempted to capture this market.

Present Market Conditions. The projected upward curve for textured yarns in today's maket has been temporarily halted and a so-called slow period has set in. Comments range from "so-so" to "lousy" as voiced by the processor through the knitter to the retail level. The reasons are (1) saturation in tried and proven applications, (2) foreign imports, (3) unexplored and new applications which have not yet reached fruition.

A thorough analysis of why both the machinery manufacturer and the processor simultaneously are slow bears out again a tragic trend so typical of the industry. In the stretch-yarn business here is what happened:

Stretch yarns were introduced in 1952 in men's socks, which continued to be the backbone of the stretch industry. Other knitting applications, such as bathing suits, gloves, panties, and other knitted intimate apparel continued an upward movement, especially during the February-June, 1958, period. This was unusual for that time of year, and yet the bonanza continued, reaching its peak in October of the same year.

The principal reason for this flourish was an application relatively unknown before 1957—knitted tights and leotards. From a minor theatrical novelty, this outlet grew until it became the biggest single use for stretch yarns. Soon, however, overselling appeared, along with poor quality, poor workmanship, and cheapening of the fabric. The result was inevitable—the bubble burst.

Retail buyers decided, along with the public, that the item was not good for another big season. Production of stretch yarns had risen tremendously when their biggest application suddenly disappeared. At present the industry is searching for something to catch the public's fancy as did leotards a couple of years ago.

In the meantime, on the other side of the textured yarn picture, the stuffer-box-type bulk yarns had been encroaching on stretch-yarn territory, helped along by superior merchandising. For about four years, since 1955, the two processes had been somewhat apart in end-use applications—the stuffer-box yarns went mostly into women's and children's outerwear.

One must agree that stretch yarns will always be specialty yarns for specific end uses. The production of bulked yarns rather than stretch yarns by stretch-yarn methods is a development that may be very important in the future. Bulked yarns have a much wider field of application than stretch, and the industry is rapidly headed in the direction of using stretch-yarn machinery for the texturing of bulk—witness such initial trials as Saaba. The growth of bulked yarns has been roughly four times that of stretch over the last five years.

New Machinery Developments. Developments in stretch and bulk have constantly been sought as a way to improve the cost situation. Some developments of the past few years include:

1. Leesona Corp.'s improvements in false-twist equipment, with new principles making it possible for spindle speeds to go from 30,000 rpm to 140,000 rpm, and now, reportedly, to 340,000 rpm. Unfortunately, these improvements came when the industry was suffering from the post-leotard recession.

2. The commercial introduction of the Spunize method of texturing heavier-denier yarns by stuffer-box principles, using multiple rather than single-end processing. At present four domestic and three foreign companies are engaged in this operation.

3. The British Scragg false-twist

TABLE 1. Costs per Pound for Producing Bulked and Stretch Yarns[1]

	Bulked		Stretch	
	North	South	North	South
Materials				
Yarn	$1.71	$1.71	$1.71	$1.71
Oils	.01	.01	.01	.01
Cartons, cones	.06	.06	.06	.06
Direct Labor				
Texturizing	.16	.14	.18	.14
Plying	.10	.08	.10	.08
Coning	.07	.06	.07	.06
Wrapping	.01	.01	.01	.01
Shipping	.01	.01	.01	.01
Indirect Labor				
Sec, billing	.02	.02	.02	.02
Factoring	.02	.02	.02	.02
Sales commission	.05	.05	.05	.05
Repairs, parts	.01	.01	.02	.02
Maintenance	.02	.02	.03	.02
Royalties[2]	.27	.27	.04	.04
Totals	$2.52	$2.47	$2.33	$2.25

[1]Using 70-denier, 2-ply, Type 300 nylon.
[2]Bulk, 20-30 cents, average 27 cents; stretch, 2-8 cents, trademark 6 cents, average 4 cents.

equipment has spindle speeds reported to be somewhat slower than 100,000 rpm, but with yarn quality alleged to be superior. There are now at least four licensees.

4. Improvements in the Textralized stuffer-box method by Joseph Bancroft & Sons Co. and Foster Machine Co. Especially noted is the Foster Attachment 88 for the processing and bulking of Textralized yarns in dyed form without loss of bulk.

5. Deering Milliken Research Corp.'s progress with Agilon, an edge-crimp-type yarn.

6. Many "do-it-yourself" processes for imparting bulk and/or stretch to yarns of all deniers, developed by an increasing number of companies who are either defying patents, and avoiding subsequent royalties, by using modifications of basic principles, or who have devised their own secret processes to accomplish the same results.

In this connection, before 1959 there were four so-called basic methods of yarn texturization: twisting, stuffing into boxes of variuos sizes under pressure, running the yarn over a hot edge or blade, and aeration or blowing the yarn in an air jet. Such methods as that used in producing Astralene, in which the yarn passes over a revolving roll at an angle are, of course, modifications, and the number of these is now estimated at several dozens.

Until clarification of the confused patent situation, it is doubtful that a clear-cut pattern of basic processes can be established. The processor, the machinery manufacturer, and others concerned must "make hay while the sun shines."

Costs of Texturization. Many a spinner or throwster has been faced with the question from his customer, the knitter and weaver, as to the costs of his operation. This, of course, was not a direct question, but by the implication that his competitors were offering better prices. Today the textured yarn processor's costs are very close to his selling prices.

A study was made by the writer of two major methods of texturizing. Six southern and five northern processors were interviewed. They use the false-twist and Textralized processes. Taslan, Agilon, and Spunize licensees were not approached; the latter two because commercial production of these is not sizable, and Taslan because business is done principally at the producer level.

Over a period of years, costs in both the false-twist and stuffer-box yarns have been pretty well established. They have varied not more than 20 per cent in the last five years, and not more than 10 per cent in the last three years. Surprisingly, direct labor costs in the textured field have recently been more marginal than in other segments of the textile industry; they amount to about 5-7 cents per pound differential between North and South. Also, in slack periods the South's larger volume and lower costs are offset somewhat by freight costs to knitters in the large metropolitan areas of the North.

As will be noted, the major costs in yarn texturization are in raw materials, which amount to over 70 per cent of the final selling price. In *Table 1* are shown the costs of producing Textralized and false-twist yarns; these figures were compiled late in the first quarter of 1960.

Royalties have always plagued processors and licensees in any business, and they are, as shown, a material factor in textured yarn costs, especially in the bulked yarns. In the past they were a definite burden on the stretch-yarn manufacturer, although they are now incorporated in the initial purchase price of his equipment.

This is not meant to imply that royalties are not necessary; the costs of development of a textured yarn process are high, and should and must be paid for by those who profit from the results. And advertising and merchandising are most costly.

At this writing, the basic patent holders, armed with legal staffs and beset by legal suits, are also hard-pressed by their licensees and customers to reduce royalties, for this seems to be the only loophole in the textured yarn cost structure.

There is wholehearted agreement that the success of a product is in direct proportion to the promotion behind it. Three typical examples of textured yarns illustrate the truth of this axiom—Tycora, Textralized, and Helanca. There are several other notable successes, but still others which are

well enough known in the trade have not succeeded over the counter. Their processors have followed the path of least resistance once the basic process was established.

Selling Prices. It is informative to compare the processors' costs, as shown in *Table I*, with selling prices over the past seven years. Typically, the early starters enjoyed considerable success, after probable early losses. But then the pattern of competition appeared, prices dropped, and business leveled out. The original belief that textured yarns would make major inroads into staple-fiber markets has not yet occurred.

Prices have dropped substantially since the introduction of textured filament yarns. The following are typical examples of average prices per pound in the metropolitan-area markets:

	Conventional Stretch	False-Twist Stretch	Textralized Bulk
1952	$4.50	$3.95	——
1953	3.85	3.50	——
1954	3.75	3.35	——
1955	3.45	3.35	3.85
1956	3.50	3.20	3.35
1957	3.60	2.85	3.45-3.85
1958	3.55-3.85	3.25-3.65	3.85
1959	3.25	2.85	2.90
1960*	2.85	2.40	2.50

*April

Comparison of the processor's costs, without profit, shows the core of his problems: He is perilously close to the break-even point. And gathering on the horizon are more storm clouds — the textured yarn developments introduced in 1958-59 by the producers.

Producer - Textured Yarns. In 1958, the Du Pont Co. introduced Type 501 nylon, a bulked filament yarn in the heavier denier range (1040 to 5000) specifically designed for floor covering applications. In a matter of months two other concerns followed suit, Chemstrand Corp. with Cumuloft and Industrial Rayon Corp. with Nyloft, offering to weavers and tufters of broadloom carpets a carpet yarn on large packages (up to 12 lb) which offered good bulk. Streak and barré problems of initial production were overcome about mid-1959.

To date, the processor of 70-, 100-, 140-, and 200-denier yarns is not affected; these yarns have not yet been offered by the producer to the hosiery and apparel trades. Producer - textured yarns sell at from 32 to 43 cents per pound above the cost of an untextured filament yarn. It is obvious that the producer could, if he chose, undersell his present customers, since his profit would come from the extrusion rather than the post-texturization. He could easily capture the market from his now-suffering customer, who is trying to sell the heavier goods market and is constantly, with newer developments, moving upwards in denier.

With the possibility of the producer moving downwards in denier and the processor and spinner having to move upwards, both parties are in a dilemma. But throughout the history of the synthetic-fibers industry the producer has avoided a "drug-store" business, and it is the writer's opinion that he will stop at about 840 denier. This means that the producer will have the heavier denier applications, such as carpets, and the processor-spinner will have to be content with the present knitting uses and the new fields being developed, such as in woven fabrics.

The fringe applications, for instance the automotive and upholstery fields, may be a battleground in the 840-denier range. However, the processor's biggest worry is that a spark may ignite a battle in the low-denier field among his suppliers.

Initially there was much mystery and speculation concerning the methods which the fiber manufacturer used to produce his textured yarns. Differential filament extrusion at the spinnerette with varying degrees of stretch, and chemical treatments of the filaments were considered. The cross sections of these textured yarns are very close to those of ordinary filaments. In the writer's opinion, and from patent studies, the 180° bend as accomplished by the Turbo stuffer-box units is the basic principle.

Both producer and processor are working toward the ultimate goal of capturing sizable portions of the spun market, which today, in spite of some alarm in 1958, is not as worried as in earlier periods. But the 65 million-pound market built up by the processor has been augmented by 10 per cent in just the last six months by producer-textured yarns.

The future is still uncertain, and the Monday-morning quarterback processor is still confused.

Slashing Creslan *(from page 100)*

1. Padding

Rhozyme DX, ¼ to ½ oz/gal.

Pad on fabric at 160 F.

Give a pick-up of 75% to 100%.

Let stand in rolled form for several hours.

Scour using 0.5% (owf) Deceresol NI Conc for 20 min at 130 F.

Rinse well.

2. Dye Bath

5% Rhozyme DX.

1% to 2% Deceresol NI Conc.

Run 30 minutes to one hour at 120-140 F.

Check for removal of starch.

Rinse well.

Note: For high sley or yarn twist, higher temperatures and/or longer processing times may be necessary.

Suppliers. Listed below are the manufacturers of the size-mix ingredients and other products recommended in this paper. While other products will also perform satisfactorily, these were employed in mill trials which have yielded excellent results.

STARCHES

Kofilm—National Starch and Chemical Corp.

Penford Gum—Penick & Ford, Ltd.

BINDERS

Elvanol—Du Pont Co.

Rezosol—E. F. Houghton & Co.

EMULSIFIABLE WAX

Seyco Wax C—Seydel-Woolley & Co.

Houghton Wax Flake — E. F. Houghton & Co.

OTHER

Rhozyme DX—Rohm & Haas Co.

Deceresol NI Conc—American Cyanamid Co.

Teflon—Du Pont Co.

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Textile Industries

Trad

Designations curr

A

Acele—Acetate filament yarns; Du Pont Co.

*Acetate**—Generic name for a manufactured fiber in which the fiber-forming substance is cellulose acetate**; American Viscose Corp.; Celanese Fibers Co.; Du Pont Co.; Eastman Chemical Products, Inc.

Acrilan—Acrylic staple, tow, and fiberfill; Chemstrand Corp.

Acrilan 16—Acrylic fiber, whiter than the original Acrilan; Chemstrand Corp.

*Acrylic**—Generic name for a manufactured fiber in which the fiber-forming substance is any long-chain synthetic polymer composed of at least 85% by weight of acrylonitrile units**; Acrilan, Creslan, Orlon, and Zefran.

Aerocor—Air-bulked fiber glass yarns; Owens-Corning Fiberglas Corp.

Agilon — High-stretch nontorque yarn; Deering Milliken Research Corp.

Algil — Polyacrylonitrile-polystyrene monofilaments; Polymers, Inc.

Alistran—Metallic yarn; Multi-Tex Products Corp.

Antron—Nylon filament yarn in which the filaments have a non-round ("tri-lobal") cross section; Du Pont Co.

Aristocrat—Rayon staple, tow, and yarn; American Bemberg.

Arnel—Triacetate staple, tow, and filament; Celanese Fibers Co.

Avicron—Latent-crimp filament rayon (for tufted products); American Viscose Corp.

Avisco—Rayon staple, tow, and filament; acetate filament; American Viscose Corp.

Avlin—Multicellular rayon staple; American Viscose Corp.

Avril—Modified cellulosic fiber; American Viscose Corp.

Avron—High-strength rayon staple; American Viscose Corp.

*Azlon**—Generic name for a manufactured fiber in which the fiber-forming substance is composed of any regenerated naturally occurring proteins**; None manufactured in the U.S.

B

Bemberg—Cuprammonium rayon filament yarn; American Bemberg.

Briglo—Bright luster rayon filament; American Enka Corp.

Bristrand—Polyvinyl chloride-polyvinyl acetate monofilaments; Polymers, Inc.

C

Cadon—Nylon yarn with multilobal cross section; Chemstrand Corp.

Caprolan—Type 6 nylon staple and filament; Allied Chemical Corp.

Celacloud—Crimped acetate staple; Celanese Fibers Co.

C *Continued*

Celafil—Abraded acetate yarn; Celanese Fibers Co.

Celaire—Twist-set acetate; Celanese Fibers Co.

Celaloft—Bulked acetate yarn; Celanese Fibers Co.

Celanese—Yarns and fibers of various types, including acetate, triacetate, and rayon; Celanese Fibers Co.

Celaperm—Solution dyed acetate filament; Celanese Fibers Co.

Celaspun—Yarn spun from acetate staple; Celanese Fibers Co.

Celatow—Acetate tow; Celanese Fibers Co.

Chadolon—Stretch torque yarn; Chadbourn Gotham Sales Corp.

Chemstrand—Type 66 nylon yarn; Chemstrand Corp.

Chromeflex—Metallic yarn; The Metal Film Co.

Chromspun—Solution dyed acetate filament; Eastman Chemical Products, Inc.

Civona—Hollow-filament rayon yarn; Du Pont Co.

Coloray—Solution dyed rayon staple; Courtaulds (Alabama) Inc.

*Color-Sealed**—Solution dyed staple, tow, and filament; Du Pont Co.

Colorspun—Solution dyed rayon staple and filament, and acetate filament; American Viscose Corp.

Cordura—Rayon filament; Du Pont Co.

Corval—Cross-linked rayon staple, crimped and uncrimped; Courtaulds (Alabama) Inc.

Cotron—Yarns and fabrics of cotton and Avisco rayon staple; American Viscose Corp.

Covinaire—Rayon filament; Industrial Rayon Corp.

Covingtone—Rayon filament; Industrial Rayon Corp.

Creslan—Acrylic staple and tow; American Cyanamid Co.

*Crinofil** — High-denier-per-filament rayon yarn for stiff or straw-type effects; Du Pont Co.

Cumuloft—Textured nylon yarn for carpets; Chemstrand Corp.

Cupioni — Thick-and-thin shantung-type cuprammonium rayon filament; American Bemberg

Cupracolor—Solution dyed cuprammonium rayon filament; American Bemberg.

D

Dacron—Polyester staple, tow, filament, and fiberfill; Du Pont Co.

Darvan—Nytril staple; Celanese Fibers Co.

Dawbarn—Saran, polyethylene, and polypropylene monofilaments; Dawbarn Brothers, Inc.

DLP—Linear polyolefin monofilaments and multifilament yarns; Dawbarn Brothers, Inc.

DLP 50—Fabric-grade polypropylene monofilaments, heat stabilized; Dawbarn Brothers, Inc.

D *Continued*

DLP 51—Fabric-grade polypropylene monofilaments, heat and sunlight stabilized; Dawbarn Brothers, Inc.

DLP 61—Rope-grade 3000/16/0 polypropylene yarn, heat and sunlight stabilized; Dawbarn Brothers, Inc.

*Dream Slub**—Rayon novelty yarn with torpedo-shaped slubs; American Bemberg

Duclé—Bulk textured yarn; Clarence L. Meyers & Co.

Dull-Fast—Dull rayon filament; Industrial Rayon Corp.

Dul-Tone—Rayon filament; Industrial Rayon Corp.

Duralene—Polypropylene monofilaments; E. B. & A. C. Whiting Co.

Durastran—Metallic yarn; Multi-Tex Products Corp.

Durastran R—Polystyrene monofilaments; E. B. & A. C. Whiting Co.

Durastran SR — Polyacrylonitrile-polystyrene monofilaments; E. B. & A. C. Whiting Co.

Dy-Lok—Solution dyed rayon filaments; Industrial Rayon Corp.

Dynaloft — Textured yarn; Leon-Ferenbach, Inc.

*Dynel**—Modacrylic staple; Union Carbide Chemicals Co. ("Dynel" is a generic term, not a trademark.)

E

Eastman No. 75—Lofted acetate yarn; Eastman Chemical Products, Inc.

Eiderlon—Rayon filament; Industrial Rayon Corp.

Englo—Dull luster rayon filament; American Enka Corp.

Enka—Rayon and nylon fibers and yarns; American Enka Corp.

Estron—Acetate filament; Eastman Chemical Products, Inc.

F

Fairtex—Metallic yarns; Fairtex Corp.

*Fiber 500**—Temporary name for modified cellulosic fiber; American Enka Corp.

*Fiber T**—Experimental acrylic fiber; Union Carbide Chemicals Co.

Fiberfrax—Ceramic (alumina-silica) fiber; The Carborundum Co.

Fiberglas — Textile glass fiber; Owens-Corning Fiberglas Corp.

Fibro—Rayon staple; Courtaulds (Alabama) Inc.

*Flaikona**—Filament rayon flake yarn; American Bemberg.

*Flake Slub**—Rayon novelty yarn with short entangled slubs; American Bemberg.

Fluflon—Filament yarn modified by the false-twist method; Marionette Mills, Inc.

Fortisan—Regular and Type 36 saponified acetate filament; Celanese Fibers Co.

F *Continued*

Fortrel—Polye
filament;
(Sold thr
Co.)

45—Polyvinyl
ments; Po

G

Garan—Textil
Manville S

Glacelon—Hig
Pilot Man

*Glass**—Gener
factured
ber-formi
Ferro C
Sales Cor
Inc.; Ow
Corp.; Pitt

Golden Caprol
yarn; Alli

Gro-Lon—Stre
Grove Nyl

H

Helanca—High
Heberlein

Helanca High
use in h
suits, et
Corp.

Helanca NT
yarn with
stantial st
Corp.

Helanca SP—S
ing, parti
material;

Helanca SS—
with soft
stretch; H

Helanca SW—
yarn for
Patent Co

Hemlon—Text
Corp.

Hi-Narco—Me
filament;
Corp.

Hytor—Torque
tex, Inc.

I

IRC—Nylon st
Corp.

J

Jetspun—Solut
nylon stap
Enka Corp

K

Kodel—Polyest
Chemical

Kolorbon—Sol
denier cri
use in ho
ford Fibre

L

Lamé—Metalli
Mills, Inc.

Leferon—Crim
Leon-Fere

Lektroset—Tw
Industrial

demarks of man-made fiber

currently used by American staple fiber, filament yarn, and textured yarn producers

ued
Polyester staple, tow, and
ent; Fiber Industries, Inc.
through Celanese Fibers

inyl chloride monofila-
s; Polyarns, Inc.

Textile glass fiber; Johns-
ille Sales Corp.
—High-stretch torque yarn;
Manufacturing Co.
Generic name for a manu-
red fiber in which the fi-
orming substance is glass**;
Corp.; Johns-Manville
Corp.; Modiglass Fibers.
Owens-Corning Fiberglas
; Pittsburgh Plate Glass Co.
aprolan—Type 6 nylon tire
Allied Chemical Corp.
—Stretch torque yarn;
e Nylon Co.

-High-stretch torque yarn;
rlein Patent Corp.
High Test—Stretch yarn for
in hosiery, tights, bathing
etc.; Heberlein Patent

NT—Nontorque textured
with soft hand and sub-
al stretch; Heberlein Patent

SP—Stretch yarn for weav-
particularly for ski-pants
rial; Heberlein Patent Corp.
SS—Highly bulked yarn
soft hand and limited
h; Heberlein Patent Corp.
SW—Limited stretch bouclé
for outerwear; Heberlein
t Corp.
Textured yarn; Hemmerich

—Medium-tenacity rayon
ent; North American Rayon

orque stretch yarn; Paten-
nc.

on staple; Industrial Rayon

Solution dyed rayon yarn,
staple and yarn; American
Corp.

olyester staple; Eastman
ical Products, Inc.
—Solution dyed, heavy-
crimped rayon staple, for
home furnishings; Hart-
Fibres Co.

etallic yarn; Standard Yarn
Inc.
Crimped, textured yarn;
Ferenbach, Inc.
—Twist-set rayon filament;
rial Rayon Corp.

L *Continued*

*Lincron**—Proposed generic name for cross linked cellulosic fibers and yarns.

Livolon—Monofilament stretch yarn; Chadbourn Gotham Sales Corp.

*Long Type "A" Slub**—Rayon yarn with long, parallel, nonentangled slubs; American Bemberg.

Lowland—Rayon yarns; American Enka Corp.

Lurex—Metallic yarns; Dow Chemical Co.

Lus-Trus—Saran, nylon, polyethylene, and polypropylene monofilaments; Southern Lus-Trus Corp.

Lycra—Spandex yarn; Du Pont Co.

M

Magiloft—Textured yarn; Madison Throwing Co., Inc.

Malora—Metallic yarn; Malina Co.

Matesa—Dull cuprammonium filament; American Bemberg.

*Measle Yarn**—Rayon yarn with part tight and part lose filaments; American Bemberg.

*Metallic**—Generic name for a manufactured fiber composed of metal, plastic-coated metal, metal-coated plastic, or a core completely covered by metal**; Dow Chemical Co.; Fairtex Corp.; Malina Co.; Metal Film Co.; Metlon Corp.; Multi-Tex Products Corp.; Nylco Products, Inc.; Reynolds Metals Co.; Standard Yarn Mills, Inc.

Metlon—Metallic yarn; Metlon Corp.

Modacrylic — Generic name for a manufactured fiber in which the fiber-forming substance is any long-chain synthetic polymer composed of less than 85% but at least 35% by weight of acrylonitrile units**; dynel, Verel.

Modiglass — Glass fibers; Modiglass Fibers, Inc.

*Multi-Strata Slub**—Rayon novelty yarn with torpedo-shaped slubs; American Bemberg.

Mylast — Crimp-type, nontorque textured yarn; Clarence L. Meyers & Co.

N

Narco—Regular-tenacity rayon filament; North American Rayon Corp.

Narcon — Super-high-strength rayon staple; North American Rayon Corp.

National — Saran monofilament, multifilament, staple, and tow; nylon monofilament; The National Plastic Products Co.

*Nub-Lite** — Nubby thick-and-thin cuprammonium filament; American Bemberg.

Nupron — Rayon filament; Industrial Rayon Corp.

Nupronium — Rayon filament; Industrial Rayon Corp.

Nylco — Metallic yarn; Nylco Products, Inc.

N *Continued*

Nylex — Nylon monofilaments; Polymers, Inc.

Nyloft—Bulked nylon monofilament yarn for carpets; Industrial Rayon Corp.

*Nylon**—Generic name for a manufactured fiber in which the fiber-forming substance is any long-chain synthetic polyamide having recurring amide groups as an integral part of the polymer chain**; Allied Chemical Corp.; American Enka Corp.; Chemstrand Corp.; Dawbarn Brothers, Inc.; Du Pont Co.; Firestone Synthetic Fibers Co.; Imperial Plastics Trading Corp.; Industrial Rayon Corp.; The National Plastic Products Co.; North American Rayon Corp.; Poliafil, Inc.; Polyarns, Inc.; Polymers, Inc.; and Southern Lus-Trus Corp.

*Nytril**—Generic name for a manufactured fiber containing at least 85% of a long-chain polymer of vinylidene dinitrile, where the vinylidene dinitrile content is no less than every other unit in the polymer chain**; Darvan.

O

Olane — Polypropylene staple and filament; AviSun Corp.

*Olefin** — Generic name for a manufactured fiber in which the fiber-forming substance is any long-chain synthetic polymer composed of at least 85% by weight of ethylene, propylene, or other olefin units**; AviSun Corp.; Dawbarn Brothers, Inc.; Firestone Synthetic Fibers Co.; Imperial Plastics Trading Corp.; Industrial Plastic Co.; Industrial Rayon Corp.; The National Plastic Products Co.; Polyarns, Inc; Polymers, Inc.; Reeves Brothers, Inc.; Southern Lus-Trus Corp.; U. S. Rubber Co.; Vogt Manufacturing Corp.; E. B. & A. C. Whiting Co.

Ondelette — Rayon yarn with randomly spaced, entangled slubs of irregular size and shape; Du Pont Co.

Orlon — Acrylic staple, tow, and filament; Du Pont Co.

Orlon Cantrece — Acrylic filament yarn; Du Pont Co.

Orlon Sayelle — Bi-component acrylic fiber; Du Pont Co.

P

Parfé — Filament rayon yarn with color spaced intermittently along its length; American Bemberg.

Perlglo — Semidull-luster rayon yarn; American Enka Corp.

Pex — Polyethylene monofilament yarn; Polymers, Inc.

Poliafil — Nylon filament; Poliafil, Inc.

P *Continued*

Polyester — Ger
manufactured
fiber-forming
long-chain
composed of
weight of an
alcohol and t
Dacron, Fortr

PPG—Textile glas
Plate Glass C

Premier—Rayon f
Rayon Corp.

Prolene—Polyprop
and filament;
Corp.

Prostran—Polypro
ments; E. B.
Co.

R

Rayflex—High-str
ment; Americ

*Rayon**—Generic
factured fiber
generated cel
manufactured
regenerated c
substituents
more than 15%
of the hydroxy
can Bemberg
Corp.; Americ
Beaunit Mill
Fibers Co.; Co
Inc.; Du Po
Fibres Co.;
Corp.; North
Corp.; Skenan

Reevon — Ultravi
fin yarns an
Reeves Brothe

Reymet — Metalli
Reynolds Meta

Rovana — Saran
flat cross secti
Dow Chemical

Royalene — Olefin
ber. Co.

S

Saaba — Bulked
modifying f
yarn; Leesona

*Saran**—Generic
factured fiber
forming subst
chain synthet
posed of at le
of vinylidene
Dawbarn Bro
Chemical Co.;
ic Fibers •C
Plastic Produ
Lus-Trus Co.

Saranspun — Yar
and not more
dyed rayon; T
Products Co.

Shalon — Polys
ments; Polyme

Skyloft — Bulked
can Enka Corp

*SM 27**—Temporar
fied cellulosic
(Alabama) Inc.

s and where to get them

Sales

eric name for a fiber in which the substance is any ynthetic polymer at least 85% by ester of a dihydric erephthalic acid**; l, Kodel, Vycron. s fiber; Pittsburgh o. lament; Industrial

ylene staple, tow, Industrial Rayon

ylene monofila- & A. C. Whiting

ength rayon fila- n Viscose Corp. ame for a manu- composed of re- ulose, as well as fibers composed of ellulose in which ave replaced not of the hydrogens l groups**; Ameri- American Enka an Viscose Corp.; , Inc.; Celanese urtaulds (Alabama) nt Co.; Hartford Industrial Rayon American Rayon doa Rayon Corp. olet-stabilized ole- d monofilaments; rs, Inc. staple and yarn; ls Co. nonofilaments with n ("Micro-Tape"); Co. yarns; U. S. Rub-

yarn made by lse-twist stretch Corp. ame for a manu- n which the fiber- nce is any long- ic polymer com- st 80% by weight chloride units**; thers, Inc.; Dow Firestone Synthet- .; The National ts Co.; Southern

n blend of saran than 30% solution e National Plastic

tyrene monofila- rs, Inc. ayon yarn; Ameri- .

y name for modi- fiber; Courtaulds

S *Continued*

Softflo — Soft-luster rayon yarn; American Enka Corp.

*Spandex** — Generic name for a manufactured fiber in which the fiber-forming substance is a long chain synthetic polymer comprised of at least 85% of a segmented urethane**; Lycra, Vyrene.

Spectran — Solution dyed Acrilan staple; Chemstrand Corp.

Spun-Black — Black solution dyed rayon filament; Industrial Rayon Corp.

Spunized — Crimp-type bulked yarn; Spunize Co. of America, Inc.

Spun-Lo — Rayon filament; Industrial Rayon Corp.

Strata-Slub — Thick-and-thin cuprammonium rayon filament; American Bemberg.

Strawn — Flat, strawlike monofilament rayon yarn for use in drapery and upholstery fabrics; Industrial Rayon Corp.

Super Cordura — High-tenacity rayon filament; Du Pont Co.

Superloft — Filament yarn modified by the false-twist method; Leesona Corp.

Super-Narco — High tenacity rayon filament; North American Rayon Corp.

Super Rayflex — Extra-high-tenacity rayon filament; American Viscose Corp.

Superwind — Rayon filament; Industrial Rayon Corp.

Suprenka — Extra-high-tenacity rayon filament; American Enka Corp.

T

Taslan — Loop-type, nonstretch bulked yarn; Du Pont Co.

Teflon — TFE-fluorocarbon staple, tow, and filament; Du Pont Co.

Tempra — High-tenacity rayon filament; American Enka Corp.

Textralized — Crimp-type, stretch nontorque yarn; Joseph Bancroft & Sons Co.

*Thick and Thin** — Filament rayon flake yarn with thick-and-thin portions; Du Pont Co.

Tiaralon — Strawlike, multifilament rayon yarn; Industrial Rayon Corp.

*Tinselfil** — Rayon yarn having high luster and crystal-like sparkle; Du Pont Co.

Topel — Cross linked rayon staple, uncrimped type; Courtaulds (Alabama) Inc.

*Triacetate** — Generic name for a manufactured fiber in which the fiber-forming substance is cellulose acetate with not less than 92% of the hydroxyl groups acetylated**; Arnel.

Tuff-Lite-L — Oriented polyethylene monofilaments; Industrial Plastic Co.

Tuff-Lite-P — Oriented polypropylene monofilaments; Industrial Plastic Co.

T *Continued*

Tycora — Textured filament yarns; Textured Yarn Co., Inc.

Tyrex — Certification mark for rayon tire cord; Tyrex, Inc. (American Enka Corp.; American Viscose Corp.; Beaunit Mills, Inc.; and Industrial Rayon Corp.).

Tyron — High-tenacity rayon filament; Industrial Rayon Corp.

U

Ultravat — Metallic yarn; Metlon Corp.

Unifab — Textile glass fibers in fabric form; Ferro Corp.

Uniformat — Textile glass fibers in mat form; Ferro Corp.

Unirove — Textile glass fibers in woven roving form; Ferro Corp.

V

Velon — Saran monofilaments; Firestone Synthetic Fibers Co.

Velon LP — Linear polyethylene monofilaments; Firestone Synthetic Fibers Co.

Venturia — Air bulked yarn; Leon-Ferenbach, Inc.

Verel — Modacrylic staple and tow; Eastman Chemical Products, Inc.

Veri-Dul — Dull rayon filament; Skenandoa Rayon Corp.

*Vinal** — Generic name for a manufactured fiber in which the fiber-forming substance is any long-chain synthetic polymer composed of at least 50% by weight of vinyl alcohol units, and in which the total of vinyl alcohol units and any one or more of the various acetal units is at least 85% by weight of the fiber**; None manufactured in the U. S.

*Vinyon** — Generic name for a manufactured fiber in which the fiber-forming substance is any long-chain synthetic polymer composed of at least 85% by weight of vinyl chloride units**; American Viscose Corp.; Polyarns, Inc.; Polymers, Inc.

Viscalon "66" — Heavy-denier crimped rayon staple, for use in home furnishings; Hartford Fibres Co.

Vitron — Textile glass fiber; Johns-Manville Sales Corp.

Voplex — Olefin and vinyl monofilaments; Vogt Manufacturing Corp.

Vycron — Polyester staple, tow, and filament; Beaunit Mills, Inc.

Vyrene — Spandex yarn; U. S. Rubber Co.

W

Wynene — Polyolefin monofilaments; The National Plastic Products Co.

Z

Zefran — Acrylic staple and tow; Dow Chemical Co.

*Not a trademark.
**As defined in Textile Fiber Products Identification Act.

Allied Chemical Corp.
261 Madison Avenue
New York 16, N. Y.

American Bemberg
261 Fifth Avenue
New York 16, N. Y.

American Cyanamid Co.
Fibers Division
111 West 40th Street
New York 18, N. Y.

American Enka Corp.
Enka, N. C.

American Viscose Corp.
350 Fifth Avenue
New York 1, N. Y.

AviSun Corp.
Post Road
Marcus Hook, Pa.

Joseph Bancroft & Sons Co.
Wilmington 99, Delaware

Beaunit Mills, Inc.
Fibers Division
261 Fifth Avenue
New York 16, N. Y.

The Carborundum Co.
P. O. Box 337
Niagara Falls, N. Y.

Celanese Fibers Co.
180 Madison Avenue
New York 16, N. Y.

Chadbourn Gotham Sales Corp.
401 Fifth Avenue
New York 16, N. Y.

Chemstrand Corp.
350 Fifth Avenue
New York 1, N. Y.

Courtaulds (Alabama) Inc.
600 Fifth Avenue
New York 20, N. Y.

Dawbarn Brothers, Inc.
Waynesboro, Virginia

Deering Milliken Research Corp.
P. O. Box 1927
Spartanburg, S. C.

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Supplement to the August 1960 issue of
Textile Industries

Sales offices of fiber producers and owners of textured yarn patents

Dow Chemical Co.
Textile Fibers Department
Williamsburg, Virginia

E. I. du Pont de Nemours & Co.
Textile Fibers Department
Wilmington 98, Delaware

Eastman Chemical Products, Inc.
260 Madison Avenue
New York 16, N. Y.

Fairtex Corp.
1808 Liberty Life Bldg.
Charlotte 2, N. C.

Ferro Corp.
Fiber Glass Road
Nashville 11, Tenn.

Fiber Industries, Inc.
P. O. Box 1882
Charlotte, N. C.

Firestone Synthetic Fibers Co.
45 Rockefeller Plaza
New York 20, N. Y.

Grove Nylon Co.
150 E. Grove St.
Scranton 10, Pa.

Hartford Fibres Co.
140 Madison Avenue
New York 16, N. Y.

Heberlein Patent Corp.
350 Fifth Avenue
New York 1, N. Y.

orp. Hemmerich Corp.
Denver, Pa.

Imperial Plastics Trading Corp.
750 Union Avenue
Union, New Jersey

Industrial Plastic Co.
216 Tingley Lane
Metuchen, New Jersey

Industrial Rayon Corp.
500 Fifth Avenue
New York 36, N. Y.

Corp. Johns-Manville Sales Corp.
22 East 40th Street
New York 16, N. Y.

Leesona Corp.
P. O. Box 1605
Providence 1, R. I.

Leon-Ferenbach, Inc.
274 Madison Avenue
New York 16, N. Y.

Madison Throwing Co., Inc.
Madison, North Carolina

Malina Co.
125 West 41st St.
New York 36, N. Y.

Marionette Mills, Inc.
Birch and Wood Streets
South Coatesville, Pa.

Metal Film Co., Inc.
40 Worth Street
New York 13, N. Y.

Metlon Corp.
432 Fourth Avenue
New York 16, N. Y.

Clarence L. Meyers & Co.
2nd and Somerset Streets
Philadelphia 33, Pa.

Modiglass Fibers, Inc.
P. O. Box 86
Bremen, Ohio

Multi-Tex Products Corp.
56 Elm Street
Newark 5, N. J.

The National Plastic Products Co.
Odenton, Maryland

North American Rayon Corp.
261 Fifth Avenue
New York 16, N. Y.

Nylco Products, Inc.
530 Main Street
Clinton, Mass.

Owens-Corning Fiberglas Corp.
717 Fifth Avenue
New York 22, N. Y.

Patentex, Inc.
666 Fifth Avenue
New York 19, N. Y.

Pilot Manufacturing Co.
Pilot Mountain, N. C.

Pittsburgh Plate Glass Co.
One Gateway Center
Pittsburgh 22, Pa.

Poliafil, Inc.
311 Palm St.
Scranton 5, Pa.

Polyarns, Inc.
545 North Main St.
Canandaigua, N. Y.

Polymers, Inc.
Middlebury, Vt.

Reeves Brothers, Inc.
1071 Avenue of the Americas
New York 18, N. Y.

Reynolds Metals Co.
Reynolds Metals Bldg.
Richmond 18, Virginia

Skenandoa Rayon Corp.
261 Fifth Avenue
New York 16, N. Y.

Southern Lus-Trus Corp.
P. O. Box 3386
Jacksonville 6, Fla.

Spunize Co. of America, Inc.
Unionville, Connecticut

Standard Yarn Mills, Inc.
62-05 30th Avenue
Woodside 77, N. Y.

Textured Yarn Co., Inc.
40 East 34th Street
New York 16, N. Y.

Tyrex, Inc.
Empire State Bldg.
New York 1, N. Y.

Union Carbide Chemicals Co.
Textile Fibers Department
100 East 42nd Street
New York 17, N. Y.

U. S. Rubber Co.
1230 Avenue of the Americas
New York 20, N. Y.

Vogt Manufacturing Corp.
100 Fernwood Avenue
Rochester 21, N. Y.

E. B. & A. C. Whiting Co.
Howard Street
Burlington, Vermont

Supplement to the August 1960 issue of

		Rayon[1]			Saponified Acetate "Fortisan"	Acetate	Cellulose Triacetate "Arnel"	Po
		Regular	Medium Tenacity	High Tenacity				Nylon
Specific gravity		1.53	1.53	1.53	1.52	1.33	1.3	1.14
Tenacity, grams/denier	Dry (70 F, 65% RH)	1.5-2.4	2.4-3.0	3.0-5.0	7.0	1.1-1.4	1.2-1.4	4.1-10
	Wet, % of dry	44-54	56-63	55-65	85	60-65	70	85-90
Tensile strength, 1000 psi (70 F, 65% RH)		29-47	47-58	58-97	138	18-23	20.0-23.3	60-149
Elongation at break, % (70 F, 65% RH)		15-30	10-20	9-20	6	23-30	25-40	13-48
Elastic recovery (70 F, 65% RH)	% recovery from % strain	82 30 2 20	82 30 2 20	82 37 2 15	82 67 2 5	94 23 2 20	88 43 3 10	100 8
Stiffness, grams/denier (70 F, 65% RH)		8.7	17	25	120	5.2	4.8-5.0	9-78
Moisture regain, %	70 F, 65% RH	11.5-16.6	11.5-16.6	11.5-16.6	10.0-11.5	6.3-6.5	3.2	4.0-4.
	Commercial	11.0	11.0	11.0	11.0	6.5	3.5	4.5
Effect of heat		Does not melt.			Similar to rayon.	Loses strength at 194-225 F; softens at 397-406 F.	Before heat treatment, sticking point is 350-375 F; after heat treatment, above 464 F. Melts at 572 F.	Sticks at 445 melts at abou
Effect of sunlight		Long exposure results in strength loss.			Similar to rayon.	Similar to rayon; slightly lower per cent loss.	Long exposure results in strength loss.	Some strengt after long ex except special No discoloratio
Effect of chemicals	Acids	About same resistance as cotton; not harmed at low concentrations and temperatures. Disintegrates rapidly in concentrated acids and at high temperatures.			Decomposed by strong acids; resistant to weak acids.	Decomposed by strong acids; soluble in acetic acid.	Similar to acetate.	Decomposed strong minera resistant to acids.
	Alkalies	No effect with cold, weak alkalies; swelling and loss of strength in concentrated alkalies.			Swelling and mercerization in concentrated alkalies; little effect cold.	Saponified; little effect from weak alkalies, cold.	More resistant than acetate; little effect up to pH 9.8, 205 F.	Little or none
	Organic solvents	Resistant			Resistant	Soluble in acetone, swollen or dissolved by many organic solvents. Softened in alcohol.	Soluble in acetone, chloroform, and methylene chloride. Swelled by trichloroethylene.	Resistant; sol some phenolic pounds and i formic acid.
Dyestuffs used		Direct, developed, azoics, and vats.			Same as rayon.	Disperse, and some azoics.	Same as acetate.	Disperse, neu dyeing metaliz acid-dyeing m chrome, some
Uses[3]		1, 2, 3, 4, 5, 6, 7			4, 7	1, 2, 3, 4, 5	1, 2, 4, 7	1, 2, 3, 4, 5, 6,

[1] Includes cuprammonium rayon.
[2] Pilot plant production.
[3] Uses: 1. Apparel 2. Upholstery and drapery 3. Floor coverings 4. Other home furnishings 5. Bonded materials 6. Tire cord 7. Other industrial uses

Properties and uses of

See the other side of this chart for man-made fiber and ya

Polyamide Fibers		Polyester Fibers	Acrylic Fibers				Modacry
ylon 66	Nylon 6		"Acrilan"	"Creslan"	"Orlon"	"Zefran"	Dynel
1.14	1.14	1.38	1.17	1.18	1.17	1.19	1.30
4.1-10.2	6.3-8.7	3.6-7.6	2.0-2.7	2.5	2.5	3.5	3.0
85-90	85-90	100	80	100	83	89	100
60-149	98-122	64-134	30-40	45	37	53	50
13-45	16-30	13-48	36-40	46	25-35	33	39
100 8	100 8	97 80 2 8	99 89 2 5	92 80 2 4	97 75 2 8	99 72 2 10	97 2
9-78	33-48	7-58	7	5.5	10	10.6	7.7
4.0-4.5	4.5	0.4	1.2-1.6	2.2	1.0-2.0	2.5	less than 0.4
4.5	4.5	0.4	1.5	2.2	1.5		0
at 445 F; t about 480 F.	Melting range: 414-428 F. Slight discoloration when held at 300 F for 5 hours. HBT type retains 90-95% of original tenacity after 24 hr at 330 F in air.	Sticks at 455 F; melts at 480 F.	Sticks at 470-480 F.	Sticks at 410 F.	Sticks at 455-480 F.	Sticks at 490 F.	Softens at 300-325 F; shrinks at temperatures above 240 F. Fire-resistant; does not support combustion.
strength loss ong exposure, special types. oloration.	In general same as nylon 66, but loses strength more slowly; no discoloration.	Some loss of strength; no discoloration; very resistant behind glass.	Resistant	Resistant	Resistant	Resistant	Some loss of strength.
posed by mineral acids; t to weak	Same as nylon 66.	Resistant to most mineral acids; disintegrated by 96% sulfuric acid.	Resistant to most acids.	Resistant to most acids.	Resistant to most mineral acids; disintegrated by 96% sulfuric acid.	Resistant to most acids.	Very resistant, except to 25% chromic, 70% nitric, and 96% sulfuric.
r none.	Same as nylon 66.	No effect, cold; disintegrated by strong alkalies at boil.	Moderate resistance cold; disintegrated by strong alkalies at boil.	Fair resistance to weak alkalies; strong alkalies cause yellowing and strength loss.	Little effect cold; disintegrated by strong alkalies at boil.	Resistant to weak alkalies; destroyed by strong alkalies.	Very resistant, except to concentrated caustic.
nt; soluble in henolic com- and in 90% cid.	Same as nylon 66.	Generally unaffected; soluble in some phenolic compounds.	Unaffected by common solvents.	Unaffected by dry-cleaning and other common solvents.	Unaffected by common solvents.	Unaffected by common solvents.	Softened by warm acetone and a few other solvents.
se, neutral- metalized, eing metalized, , some directs.	Same as nylon 66.	Disperse, developed (azoic), cationic.	Disperse, basic, acid, acid- and neutral-dyeing metalized, chrome.	Disperse, basic, milling, neutral metalized, acid, acid metalized, chrome, direct.	Disperse, cationic, basic, acid.	Neutral-dyeing metalized, chrome, direct, disperse, sulfur, vat, and naphthol.	Disperse, neutral-dyeing metalized, neutral-dyeing acid, cationic, some vats.
4, 5, 6, 7	1, 2, 3, 4, 5, 6, 7	1, 2, 4, 7	1, 2, 3, 4, 7	1, 2, 3, 4, 7	1, 2, 4, 7	1, 2, 4, 7	1, 2, 3, 4, 5, 7

FREE REPRINTS of this chart are available, on the basis of one per reader, as long as the supply las

the man-made fibers

n trademarks and location of producers' sales offices.

lic Fibers "Verel"	Nytril "Darvan"[2]	Vinyon	Saran	Polyolefin Fibers			Foil-Polyester	P
				Polyethylene		Poly-propylene		
				Conventional	Linear			
1.37	1.18	1.35	1.70	0.92	0.95-0.96	0.90	1.82	
2.5-2.8	1.71-2.3	0.6-0.7	up to 2	1.0-2.5	4.0-7.5	4.8-7.0	1.0	
	85	100	100	100	100	100	100	
44-49	26.5	10-12	up to 44	11-30	48-90	55-81	15.7	
33-35	25-35	10-13	15-25	20-60	10-30	15-25	70-130	
79 63 2 5	95 85 2 5	99 2	98.5 93.0 3 10	95 5	95 80 5 10	100 93 10 20		
8.0	7	5.8	3-12	2-12	20-40	20-50		
3.5-4.0	2.5	0	0	0	0	0	Negligible	
		0	0	0	0	0		
Fiber properties begin to deteriorate rapidly at 266-302 F. Type FR extremely flame resistant.	Softens at 340-350 F. Loses 30% of strength at 250 F, 50% at 300 F. Flammability similar to cotton.	Shrinks at 150 F; melts at 250 F.	Softens at 240-280 F; melts at 340-350 F.	5% shrinkage at 165 F; melts at 230-250 F.	Shrinks 1.6 to 7.1% at 212 F; melts at 280 F.	Shrinks: 5% @ 180 F. 7% @ 210 F. 9% @ 240 F. 28% @ 275 F. 50% @ 300 F. Softens at 320 F; melts at 333 F.	Sticks at 425 F; melts at 500 F (film only; figures for yarn lower).	
Resistant	Resistant	None	Darkens slightly.	Some strength loss for clear filaments, less for pigmented.	Same as conventional; can be stabilized.	No discoloration, stabilized type retains 95% of strength after 6 months in sunlight.	Variable; depends on color and method of manufacture.	
Resistant to most acids.	Resistant to most acids.	Very resistant.	Resistant to most acids.	Very resistant.	Very resistant.	Very resistant.	Readily attacked by strong mineral acids.	
Resistant	Moderate resistance cold; disintegrated by strong alkalies at high temperatures.	Resistant	Resistant, except to ammonium hydroxide.	Very resistant.	Very resistant.	Very resistant.	Readily attacked by strong alkalies.	
Soluble in warm acetone; unaffected by most other common solvents.	Not affected by dry-cleaning solvents.	Soluble in ketones and chlorinated hydrocarbons; swelled and softened by ethers, esters, and others.	Swelled or softened by oxygen-bearing solvents at elevated temperatures.	Soluble in some solvents at temperatures above 160 F.	Same as conventional.	Same as conventional polyethylene.	Variable	
Neutral-dyeing metalized, disperse, basic, some acid.	Disperse, azoic, basic.	Disperse	Disperse, some azoics.	Practically undyeable.	Same as conventional.	Pigmented before extrusion.	Colored by manufacturer.	
1, 7	1	5	2, 3, 4, 7	2, 7	2, 7	2, 7	1, 2, 3, 4, 5, 7	1

s. Write to the Editors, "Textile Industries," 806 Peachtree Street, N. E., Atlanta 8, Georgia

Supplement to the August 1960 issue of

Metallic Yarns		TFE-Fluoro-carbon "Teflon"	Glass		
Metalized Polyester (3-Ply)	Foil-Butyrate				
1.39	1.41	2.3	2.54	Specific gravity	
1.5	0.4	1.6	6.0-7.3	Dry (70 F, 65% RH)	Tenacity, grams/denier
100	70	100	65	Wet, % of dry	
23.0	6.7	47	200-220	Tensile strength, 1000 psi (70 F, 65% RH)	
70-130	25	13	3.0	Elongation at break, % (70 F, 65% RH)	
			100 3	% recovery from % strain	Elastic recovery (70 F, 65% RH)
		12	300	Stiffness, grams/denier (70 F, 65% RH)	
Negligible	1	0	0	70 F, 65% RH	Moisture regain, %
	1	0	0	Commercial	
Sticks at 425 F; melts at 500 F (film only; figures for yarn lower).	Loses strength at 190 F; melts at 400 F (film only; figures for yarn lower).	Nonflammable; gels at 620 F.	Nonflammable; loses up to 50% of strength at 650 F, continues to decline and softens at 1350 F.	Effect of heat	
Variable; depends on color and method of manufacture.	Variable; depends on color and method of manufacture.	None	None	Effect of sunlight	
Readily attacked by strong mineral acids.	Readily attacked by strong mineral acids.	Affected only by fluorine and chlorine trifluoride at high temperatures, and by molten alkali metals.	Resists most acids; attacked by hydrofluoric and hot phosphoric acids.	Acids	Effect of chemicals
Readily attacked by strong alkalies.	Readily attacked by strong alkalies.		Resists most alkalies; attacked by concentrated alkalies, and by hot weak alkalies.	Alkalies	
Variable	Variable		Unaffected	Organic solvents	
Colored by manufacturer.	Colored by manufacturer.	Practically undyeable	Resin-bonded pigments.	Dyestuffs used	
1, 2, 3, 4, 5, 7	1, 2, 3, 4, 5, 7	7	2, 7	Uses[3]	

Compiled by the editors of TEXTILE INDUSTRIES from information supplied by the manufacturers of the synthetic fibers, supplemented by data from "Harris' Handbook of Textile Fibers" and "A.S.T.M. Standards on Textile Materials."

Proceedings of the 1960

Cotton Research Clinic

Exclusive

Presiding at the eleventh Cotton Research Clinic were (l to r): **Werner Pels** of the National Cotton Council, chairman of the Tuesday morning session; **Ashley B. Roberts** of China Grove Cotton Mills Co., chairman of the Wednesday morning session; **M. Earl Heard** of West Point Mfg. Co., general chairman; and **B. F. Tipton** of Woodside Mills, chairman of the Monday afternoon session.

■ FOUR ADDITIONAL PAPERS presented at the recent eleventh annual Cotton Research Clinic are published in full in this issue of TEXTILE INDUSTRIES.

Pages 99-117 of the July, 1960, issue contained the full text of the following papers: (1) Effect of fiber length on single fiber tensile and resilience properties; (2) Span length as a fiber length criterion; (3) Appraisal of the Digital Fibrograph and Fibrosampler from the mill viewpoint; (4) The Phantom drafting system.

The five remaining papers will appear in the September and October issues. Upon completion of the series, the entire proceedings will be reprinted in booklet form, with reprints available free upon request to the National Cotton Council, sponsor of the Clinic, or TEXTILE INDUSTRIES.—The Editors.

Mill control of short fiber percentage for improved spinning performance

by Lindsay Dexter and Richard Sweeney
Pepperell Manufacturing Co.

IT IS particularly appropriate to discuss the question of short fibers and their relation to overginning and spinning performance at the eleventh annual Cotton Research Clinic, as it was at the sixth Clinic in 1955 at Pinehurst, N. C., that Helmut Wakeham of the Textile Research Institute presented the basic work on this subject, entitled "Cotton Fiber Length Distribution—An Important Quality Factor."

In analyzing the cottons used in the now famous Joanna Mill Test, which had been subjected to different degrees of heat during ginning, the only significant difference in fiber properties which Dr. Wakeham and his co-workers at TRI were able to find between the cottons ginned with low heat and those ginned with high heat was that, measured by the single fiber number-length distribution method, those ginned with high heat showed a larger number of short fibers (i.e., in the area below ½ inch). Since both cottons were harvested together, it was concluded that these short fibers had been broken off in ginning. This was the first time anyone had connected overdrying of cotton in ginning with fiber breakage and a subsequent increase in spinning ends-down.

The mill, upon whose experience most of the data to be reported are based, started having trouble as soon as the 1958 Memphis cottons hit the spinning room. As the percentage of '58 cotton in the mix increased, ends-down in spinning likewise increased spasmodically.

In early 1959 the situation became desperate and every possible means for remedying it was explored. Opening room feeders were modified for better blending of cotton; speeds and drafts were reduced, twist gears, roll settings, and travelers were changed, all without effect. None of the usual fiber measurements gave any clue to the trouble. Even Suter-Webb arrays for coefficient of variation failed to show a significant change that could be related to the violent fluctuations in ends-down.

Finally, in April of 1959 a paper (1)[1] by William A. Faught of the USDA came to the attention of the laboratory. This paper contained a statement which triggered a whole new program for control of short fibers: "The proportion of fibers

[1]Numbers in parentheses designate references at the end of the paper.

shorter than ½ inch is the only fiber measurement thus far available from the test which was significantly correlated with ends-down." This brought back memories of Dr. Wakeham's paper, which was re-studied with interest.

In order to speed up short-fiber measurements, a series of experiments was run using the Servo Fibrograph, and it was discovered that it was possible to correlate the percentage of fibers shorter than ½ inch measured by that instrument with those obtained by the Suter-Webb array method. The coefficient of correlation was 0.93, indicating excellent relationship.

Control Program. Desperate situations require desperate methods, and it was in this manner that a crash program for the control of short fibers in the mix originated. It was found that some of the cotton going through the mill measured as high as 25 per cent of fibers shorter than ½ inch. Calculations by the laboratory showed that 14 per cent short fibers in a 1 1/16-inch cotton based on Suter-Webb arrays was equivalent to 35 per cent CV, which previous experience had shown was the upper limit for good spinning. Therefore, 14 per cent was set as the maximum of short fibers allowable in a mix.

The following system for controlling mixes was set up:

1. Before a mix was laid down, a small sample of cotton from each bale was sent to the laboratory where it was blended and a composite test for short fibers run on the Servo Fibrograph.

2. If the composite short-fiber percentage was 14 per cent or below, the mix was allowed to be opened. If it was over 14 per cent, the mix was held out and another mix substituted. Samples from each individual bale in the faulty mix were redrawn and tested individually on the Fibrograph. The bales with the highest per cent of short fibers were eliminated from the mix and other bales substituted in order to bring the average of short fibers down to 14 per cent. Then the reconstituted mix was put back into production.

During the early stages of the use of this method, it was not uncommon to have to replace or reconstitute four or five mixes a day with some of the mixes running as high as 21 per cent average short fibers. At the end of about two weeks the results of this program began to be seen as ends-down in spinning started to decrease. The most notable result was that the blowups in spinning that had been experienced in the past six or eight months were eliminated.

The next step was to evaluate the short-fiber index of the various lots of cotton in the mill warehouse. Twenty-five bales from each 100-bale lot were sampled and composite blends made of them. The composite sample was then tested on the Fibrograph for per cent short fibers and the lot identified with a short-fiber index. Eight per cent was used as the figure for low short fibers, 12 per cent for medium, and 16 per cent for high short fibers.

After the stock of cotton in the warehouse had been evaluated for short fibers, a program for checking incoming cotton was initiated. Ten samples from each 100-bale lot of cotton received were sent to the laboratory, made into a composite, tested for per cent short fibers, and the lot then identified by this percentage. After this method had been in operation for a few weeks, it was possible to control the percentage of fibers in a mix by picking cotton from lots with the required percentage of short fibers and blending high, medium, and low short-fiber lots to arrive at a satisfactory average. With the short-fiber problem under control it was possible to lower the maximum average percentage allowed in a mix from 14 to 12 per cent with a subsequent improvement in spinning operation.

Checking Short Fibers Before Shipment. At the start of the 1959-60 cotton season, the short-fiber measurement program was extended to evaluating cotton before shipment. When the new crop first started moving, several shippers were requested to send samples of cotton from various gin points for testing. Some areas were found to have lower percentages of short fibers than others, and these desirable points were called to the shippers' attention. Although this early shipment cotton had been bought on description, they cooperated by shipping cotton from the selected points.

Later in the season individual lots were checked for short-fiber content before purchase. Shippers were asked to submit a handful from each of 100 bales before the samples were sent up to be approved. Composite samples were made from these pinches and short-fiber tests run. This method of sending pinches ahead of time not only saved the shipper considerable money in sample shipping costs, but also speeded up the operation. If the short-fiber measurement of the pinches turned out to be satisfactory, the shipper was instructed to send the actual samples or to ship that cotton on description. This method was pursued with a limited group of shippers, both large and small, and worked equally well in either case.

Some shippers agreed to send samples periodically from various ginpoints in which they were operating for short-fiber testing, with interesting results. After a number of lots from a certain gin had passed the tests several lots from the same point were turned down because of excessive short fibers. This produced a complaint from the shipper that the machine must be out of order because the cotton came from the same field and the same gin. After rechecking the short fibers, it was suggested that the ginner be contacted to see what had been done. The ginner at first claimed that no change had been made; but after investigation of the matter, he admitted that operating conditions had inadvertently been changed either by increasing heat or speeding up the flow of cotton.

In August 1959 a Digital Fibrograph was purchased. The elimination of tangent drawing errors, the increased accuracy, and the shorter time required per test all contribute to the desirability of this new instrument. Having correlated the Servo-Fibrograph most thoroughly with Suter-Webb arrays in production, the Digital Fibrograph was run in parallel with the Servo for a number of weeks before putting the Digital into the production line. The results of the comparative tests

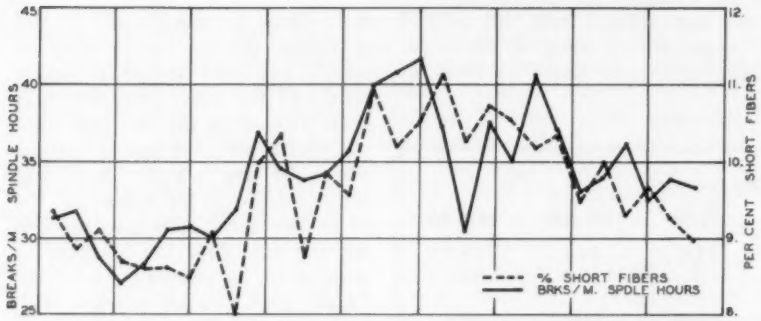


Figure 1. Daily record for six weeks period of per cent short fibers and spinning ends-down.

showed excellent correlation between the two instruments, the coefficient of correlation being 0.985.

The method of short-fiber control just described has been in use at one plant for over a year. In that time it was possible to see the sensitivity of spinning end breakage to changes in per cent of short fibers as it reacted rapidly to an increase or decrease in the amount of short fibers being processed. *Figure 1* shows per cent short fibers and spinning ends-down plotted over a six-week period.

Ends-Down and Quality Tests. In order to get quantitative and qualitative data, a special series of tests was set up. A spinner's set was selected that was midway through its plumbing and scouring cycle. This set consisted of 18½ sides. Four frames in the set were selected as test frames. The balance were used for controls. The object of the test was to pinpoint the amount of influence that different percentages of short fibers have on spinning ends-down and yarn quality under average mill conditions.

It was decided to run three different levels: 8 per cent (low), 12 per cent (average), and 15 per cent (high). The test ran for a period of six weeks, covering all three shifts with the exception of Saturdays. A total of 1,199,303 spindle hours was observed.

It was decided to roll the roving for these samples into the set rather than block creel in order to get the reaction of breaks as they normally occur. Only figures obtained after the test frames were 100 per cent on the sample were used for statistical analysis of variance. However, all of the figures are plotted to show the gradual build-up and return to normal of the ends-down after running a sample.

Fifteen-bale mixes were used in each case except for the 15 per cent lot, where only 10 bales could be found with a sufficiently high short-fiber content to produce that high an average per cent of short fibers. In this 15 per cent test the last few doffs on the roving frame were only partial doffs to permit longer 100 per cent sample study hours. You will note in the graphs that this sample returned to normal more abruptly than the other two.

Table 1 shows a breakdown of the fiber properties of the three mixes. The Pressley break and Micronaire as well as the staple length of the three samples were controlled as closely as possible. It is interesting to note that the average per cent of short fibers of the individual bales in the three mixes is very close to that of the composite blend of the 15 bales. This confirms the feasibility of using composite samples in checking short-fiber content of mixes.

The sample with 8 per cent short fibers showed 32.6 breaks per 1000 spindle hours, with a yarn break factor of 1904. The sample with 12 per cent short fibers showed 52.1 breaks per 1000 spindle hours, an increase of 59.8%, with a yarn break factor of 1753, which was a 7.9 per cent decrease in strength from the 8 per cent sample. The sample with 15 per cent short fibers showed 54.8 breaks per 1000 spindle hours, an increase of 68 per cent over the 8 per cent sample with a break factor of 1620, a decrease of 14.9 per cent from the 8 per cent sample. These results are

TABLE 1. Fiber Data

		8% SF	12% SF	15% SF
		SLM Bright	SLM Bright	SLM Bright
Staple Length				
Suter-Webb 25% point		1.225	1.230	1.225
Classer's equivalent		1-1/16	1-1/16	1-1/16
Micronaire, mg		4.28	4.22	4.38
Pressley break, 1000 lb/sq in.		80.8	80.5	79.6
Fibers shorter than ½" (longer than 3/16"), %				
Bale	1	2.6	12.7	15.4
	2	10.1	12.3	17.0
	3	6.1	13.0	15.7
	4	6.5	10.9	14.7
	5	8.7	9.4	14.4
	6	7.8	13.6	14.6
	7	8.6	13.9	14.2
	8	5.3	10.0	17.9
	9	9.8	12.1	15.6
	10	5.9	10.0	14.6
	11	5.8	10.1	
	12	9.6	14.4	
	13	12.2	13.7	
	14	11.2	12.1	
	15	10.6	11.4	
	Average	8.05	11.97	15.40
Composite Short Fibers from Blend, %		7.80	12.20	15.0

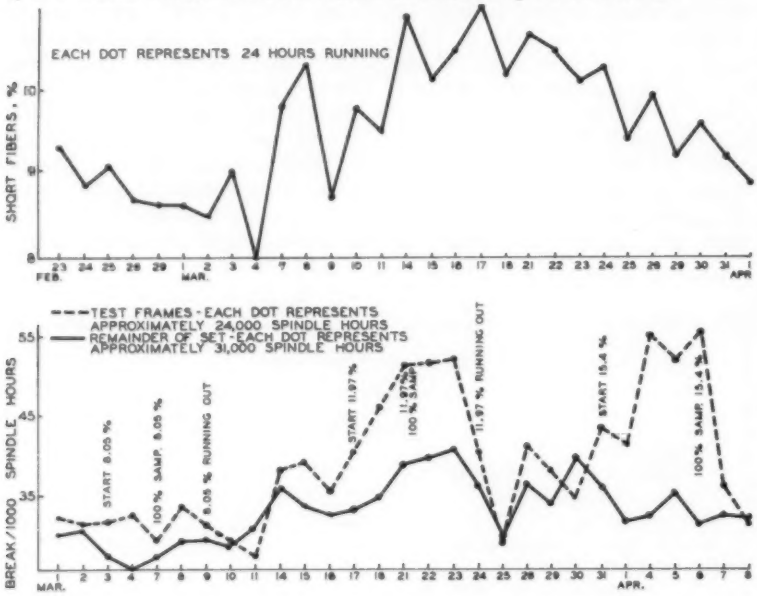
shown in tabular form in *Table 2*.

The graph in *Figure 2* shows the breaks per 1000 spindle hours of the test frames and the control frames during each of the tests. You will note that the level of ends-down for the control frames is higher during the running of the 12 per cent test than during either of the other two, which is corroborated by the fact that during that period the per cent short fibers in the regular mix was higher than during either of the other two tests. This may account for the fact that the increase in ends-down between 8 per cent and 12 per cent is more marked than that between 12 per cent and 15 per cent.

TABLE 2. Test Results

	8% SF	12% SF	15% SF
Breaks/1000 spindle hr	32.6	52.1	54.8
Increase, %	-	59.8	68.1
Yarn break factor (skein breaks)	1904	1723	1620
Decrease, %	-	7.9	14.9
Single-end breaks			
Grams to break	334	321	298
Elongation, %	8.3	7.8	7.2
Coefficient of variation, %	13.1	11.8	13.2

Figure 2. TOP—Per cent short fibers for about five weeks. BOTTOM—Breaks per 1000 spindle hours on the test frames and the control frames during each of the tests.


EACH DOT REPRESENTS 24 HOURS RUNNING
SHORT FIBERS, %
FEB.
MAR.
APR
TEST FRAMES - EACH DOT REPRESENTS APPROXIMATELY 24,000 SPINDLE HOURS
REMAINDER OF SET - EACH DOT REPRESENTS APPROXIMATELY 31,000 SPINDLE HOURS
BREAK/1000 SPINDLE HOURS
START 8.05 %
100 % SAMP. 8.05 %
8.05 % RUNNING OUT
START 11.97 %
100 % SAMP.
11.97 % RUNNING OUT
START 15.4 %
100 % SAMP. 15.4 %

You will note, however, that there are three bad actors on this graph, namely the three points of the 12 per cent test. As mentioned before, it appears that the reason for this is that the regular work, or control, was running at a higher rate both of per cent short fibers and ends-down during the period of the 12 per cent test. High end-

An analysis of variance was made on the data gathered from these tests, taking into account the influence of shift, frame, and stock processed. This indicates that the stock processed with different percentages of short fibers had a highly significant influence on ends-down. Using the data that went into *Figure 2* a second graph, *Figure 3*, was constructed showing the correlation between per cent short fiber and spinning ends-down. In spite of the fact that the particular short fiber mixes may affect more than one day's spinning performance and that there are other outside influences at work, an excellent correlation exists. The coefficient of correlation was found to be .90 which is considered very good.

Figure 3. Scatter diagram showing relationship between per cent of fibers shorter than one-half inch in the raw cotton and spinning ends down per 1000 spindle hours upon processing such cotton.

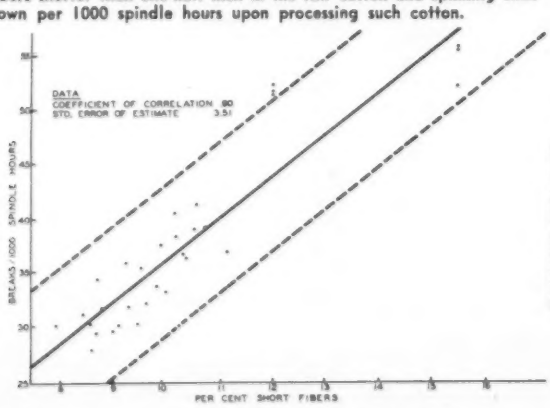
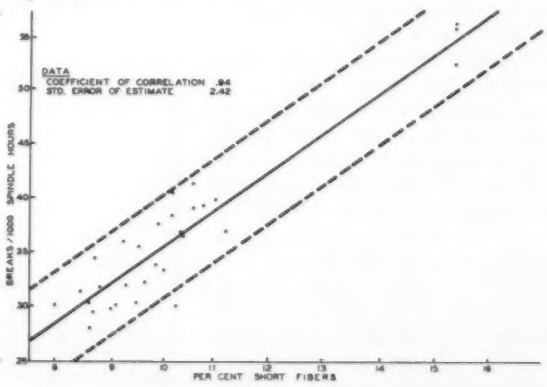


Figure 4. Scatter diagram prepared from same data as Figure 3 but with the 12 per cent figures eliminated. Note that correlation goes up to 0.94.



breakage on the control frames coupled with higher end-breakage on the sample frames taxed the spinners so that their cleaning duties were not performed on schedule. It is well known that ends-down breed other ends-down and this could have influenced the 12 per cent test. In order to prove out this theory a third graph, *Figure 4*, was prepared, eliminating the 12 per cent figures. The coefficient of correlation now goes up to 0.94, with the standard error of estimate reduced from 3.5 to 2.42.

Although data reported on are based on the experience of one mill using a single-apron spinning drafting system, similar results were obtained in less extensive tests made in another plant using high-speed drawing, double-apron roving, and double-apron spinning. Although the degree of change in the ends-down and breaking strength was similar to that found in a single-apron draft system, the level of spinning ends-down remains within the limits required for good running.

The maximum per cent of short fibers acceptable to one mill may not correspond to that acceptable to another, depending on the cotton being used, yarn organization, and machinery setup. However, the basic principles established by the tests reported still apply; namely, that an increase in the per cent of fibers shorter than ½ inch in a cotton mix will result in an increase in spinning ends down and a decrease in yarn breaking strength. Other factors also resulting from increase in short fibers are higher waste percentage, more fly in the air, and a drop in weaveroom efficiency.

The result of the tests just described plus the experience gained during the past year and a half in avoiding fluctuations in spinning ends-down leads to the conclusion that control of short fibers in cotton mixes can be used to advantage as a practical production tool.

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Effect of short fibers in cotton on spinning performance and yarn properties

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THE SHORT fibers (less than ⅜ inch) in a cotton and their effect on yarn properties have been discussed previously (4, 5)[3]. It was shown that increases in short-fiber content were detrimental to strength, appearance, and virtually all other yarn properties.

However, sufficient amounts of cotton were not available for these previous investigations to determine quantitatively the effect of short fibers on spinning efficiency. Unfortunately, the measurement of this highly important property by spinning 5, 10, or more thousand spindle hours is time consuming and requires quantities which often exceed those available in experimental cottons. Therefore, it was desirable that a shorter yet efficient procedure for determining the ends down rate be developed.

A fuller discussion of the background and basis of this spinning evaluation test appears in another paper (6) and hence only the procedure and its application will be discussed here.

Experimental Material. The cotton used in these experiments was Acala 44 raised on the same farm in Arizona in 1957 and 1958. The seed cotton was ginned at the U. S. Southwestern Cotton Ginning Research Laboratory, Mesilla Park, N. M., using both normal and differential ginning techniques (2).

Table 1 shows the short-fiber contents and upper quartile

Summary

While previous work had shown that short fibers (less than ⅜") were generally detrimental to yarn properties, their effect upon spinning efficiency had not been fully investigated. It is now shown that their effects are extreme and exponential as spindle speed is increased. Further, there are strong interactions among short-fiber content, spindle speed, yarn size, and twist, with the adverse effect of high short-fiber content being minimized by increases in yarn size and twist, and by decreases in spindle speed. This indicates the desirability of giving consideration to the short-fiber content of a cotton when allocating it to cotton blends for different types and sizes of yarns.

As an aid to the evaluation of the relative spinning performance of cottons containing different percentages of short fibers, a somewhat shortened test procedure was used. By efficient recording and handling of the data it appears that about 720 spindle hours are sufficient to determine the relative spinning efficiency within ± 30% at the 95% confidence level.

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[3]Numbers in parentheses designate references at the end of the paper.

TABLE 1. Selected Fiber, Carding, and Roving Data for Acala 44 Cotton at Five Levels of Short-Fiber Contents

Finisher Picker Lap		Second Drawing Sliver		Card		Roving
Short-Fiber Content	Suter-Webb UQL	Short-Fiber Content	Suter-Webb UQL	Total Waste	Neps	Roving Twist
% weight <3/8"	inch	% weight <3/8"	inch	%	neps/ gr	tpi
5.5	1.23	4.5	1.25	6.48	1.66	1.43
11	1.19	9	1.22	6.62	1.40	1.62
17	1.20	14 (A)	1.18	9.40	2.38	1.67
19	1.11	14 (B)	1.16	7.79	2.64	1.73
22	1.12	15	1.18	9.32	2.66	1.73

lengths of samples of picker lap and second drawing sliver for five levels of short-fiber contents. These short fiber values are for 3/8 inch and less; for approximate 1/2 inch and less values, multiply by 1.5 (6). Since the objective of this work is to determine the effect of short fibers on spinning efficiency, the cottons will be referred to hereafter by the percentage of short fibers in the second drawing sliver. This figure is more representative of the cotton fibers presented to the spinning-drafting system than the short-fiber content of the picker lap or cotton bale.

From *Table 1* it will be seen that the short-fiber content decreased from picker lap to second drawing sliver in each case. Analyses indicate that between 20 and 30 per cent of this decrease can be explained by the short fibers removed in the form of flat strips. It is interesting that two of the levels of short fiber content differing by 2% in the picker lap became identical in second drawing sliver.

The 4.5% cotton is first pass, differentially ginned lint from the 1957 crop as also is the 9% cotton from the 1958 crop (2). The 14% (A) cotton is normally ginned lint from the 1958 crop, while the 14% (B) and 15% cottons are blends of second pass, differentially ginned lint from the 1957 and 1958 crops of Acala 44 cotton, principally from the 1958 crop. Thus, the changes in length seen in *Table 1* must be kept in mind and, while not desirable, were unavoidable when using ginning techniques to produce different levels of short-fiber content from the same lot of seed cotton.

Table 1 also shows that total card waste, nep count, and the roving twist required for approximate uniform hardness of 1.50-hank roving (400 tex) generally increased as short-fiber contents increased. These findings are in agreement with previous findings of the effect of short fibers on roving twist (4).

Spinning Efficiency Test Procedure. Since only about 400-500 pounds of each short-fiber-content cotton were available, it was desirable to obtain the maximum amount of data in the shortest spinning time. All spinning tests were conducted on a Whitin[4] Piedmont frame of 240 spindles and 2¼-inch rings for which each had been consecutively numbered from 1 to 240. To investigate the effect of roving-package size on end breakage and to minimize any such effect on the validity of the conclusions, each cotton was creeled on a random pattern with 40, full; 40, 2/3 full; and 40, 1/3-full roving bobbins on each side of the frame. Each 15 minutes the frame was patrolled, any ends down were put up, and the respective spindle numbers were recorded. From the creeling pattern the frequency of end breakage for each size of roving bobbin was determined.

As a further cotton-conserving technique, replacement roving bobbins were made with the initial portion consisting of "dummy" cotton. Thus, for example, when the 1/3-full bobbin of the original creeling became empty, it was replaced with a full bobbin consisting of 1/3 "dummy" cotton and the top 2/3 of experimental cotton. After this partial creeling, the position formerly occupied by the 1/3-full bobbin was occupied by a full bobbin and, of course, the former full bobbins were now reduced to 2/3 full, while the former 2/3-full bobbins were now only 1/3 full. This afforded a progression of bobbin size among the spindle positions.

Subsequent statistical analysis indicated that end-breakage rate is affected to some extent by the fullness of the roving bobbins but in an equal manner for all combinations of short-fiber-content cottons, yarn size, etc. This means that it is highly desirable to have a range of roving bobbin sizes present at any one time on the spinning frame. This procedure allows valid comparisons among succeeding tests even though the ends-down data from the several different sizes of roving bobbins are combined as was done in these tests.

Previous experiments (6) had indicated the desirability of transforming the data as recommended by Bartlett (1). The transformation used was:

$$Y = \log (1 + \text{no. ends down in 15-min period})$$

This transformation seemed to make the variance of the new variable, Y, independent of the mean ends-down rate and allowed use of analysis of variance procedure (3). From the variance estimates of the previous experiments it was indicated that where the data are recorded each 15 minutes, a three-hour run of about 720 spindle hours would allow the ends-down rate to be determined within ± 20%. For cottons spinning outside the limits of approximately 20 to 150 ends down/1000 spindle hours, control chart "no-go" criteria were established to end the test after about ½ hour of spinning, thus conserving cotton and time.

To define the curve showing the effect of speed for a particular cotton at a particular yarn number and twist multiplier, at least three points were required. The experiment was accordingly planned to give at least two "go" tests; i.e., with an ends-down rate

[4]The mention of trade names does not imply their endorsement by the Department of Agriculture over similar products not mentioned.

Fig. 1A. The effect of spindle speed on spinning efficiency for the five levels of short-fiber content—30/1, 3.75 TM.

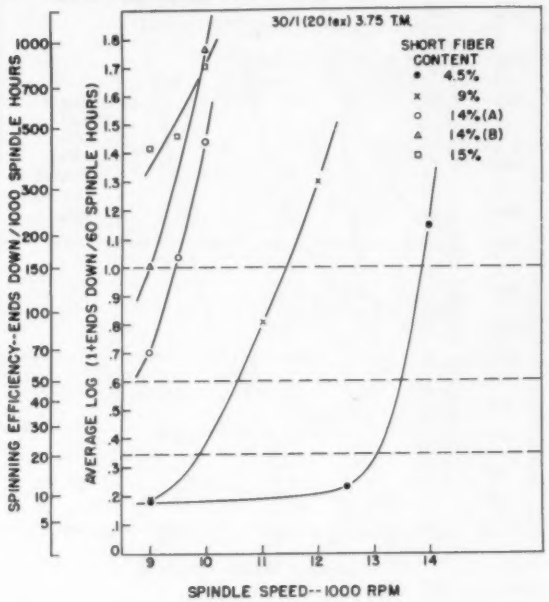
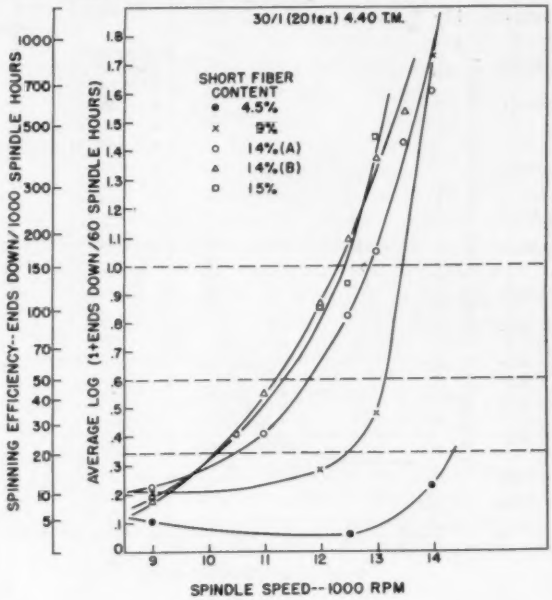


Fig. 1B. The effect of spindle speed on spinning efficiency for the five levels of short-fiber content—30/1, 4.40 TM.



lower than 150/1000 spindle hours, and consequently 720 spindle hours of spinning. Also, it was planned to increase speed on successive tests until more than 150 ends down/1000 spindle hours or a "no-go" test was obtained. This latter test might consist of as little as 120 spindle hours. No test was run at spindle speeds of less than 9000 rpm and each short-fiber-content cotton was tested at this speed.

While an investigation of the effect of traveler weight would have been highly desirable, for this experiment it was decided to reduce the number of variables by using the same traveler for all speeds of a given yarn number. Preliminary investigation indicated that for the 30/1 (20 tex) yarn an 8/0 elliptic traveler was the most satisfactory in allowing maximum speeds while still not resulting in balloon collapse at the minimum speed of 9000 rpm. Similarly, for the 40/1 (15 tex) a 14/0 elliptic traveler was used. All travelers were changed after a maximum of about 24 hours use.

To eliminate possible effects of variation in tension on end breakage due to spinning at or near the empty or full bobbin positions, all spinning was done in the mid-region of the bobbin. The frame was doffed after each cotton-yarn number-twist-speed combination. The yarns from the "go" spinning tests were retained and yarn properties determined.

The spinning performance of the Acala 44 cotton containing different levels of short fiber contents was evaluated in 30/1 (20 tex) and 40/1 (15 tex) with each yarn number spun using twist multipliers of 3.75 (filling) and 4.40 (maximum strength).

Discussion of Results. The results are summarized in *Figures 1A-D* and show the marked effect of short fiber content and spindle speeds on end breakage. The dotted lines at 20 and 150 ends down/1000 spindle hours indicate the approximate limits of the "go" region of the experimental procedure. The line at 50 is presented to aid the reader in taking intercepts at a reasonable level of spinning efficiency. The variance of the ends-down data obtained were such as to permit the estimation of relative spinning efficiency within ± 30% at the 95% confidence level. This is larger than the 20% previously estimated and may be due to the abnormally high short-fiber contents encountered in three of the five cottons.

The ends-down rate for increasing short-fiber-content cottons is seen to become divergent as spindle speed is increased. Thus, for the 30/1, 4.40 TM yarn, all of the short-fiber levels spun exceptionally well at 9000 rpm; however, when spindle speed was increased, the end breakage rates of the yarns spun from the cottons with higher short-fiber contents increased exponentially and rapidly became unspinnable, while the end breakage rate of the 4.5% cotton remained below the lower experimental design limit of 20 ends down/1000 spindle hours, even at spindle speeds of 14,000 rpm.

On the other hand, even at the low speed of 9000 rpm, the three cottons containing over 10% short fibers could not be spun into 40/1 yarns of filling twist without impractically large end breakages. The tendency of these three cottons, similar in short-fiber content, to group together in all the figures lends credence to the evaluation.

The effect of twist alone may be seen in *Figure 1* if the performance of the 30/1, 4.40 TM is compared with the 30/1, 3.75 TM in *Figures 1A* and *B*. At 9000 rpm, the 4.5% and 9% cottons behaved similarly at each of the twist levels. However, the three cottons with higher short-fiber content had a much higher end breakage rate at the 3.75 TM, which was in contrast to their behavior at the

Fig. 1C. The effect of spindle speed on spinning efficiency for the five levels of short-fiber content—40/1, 3.75 TM.

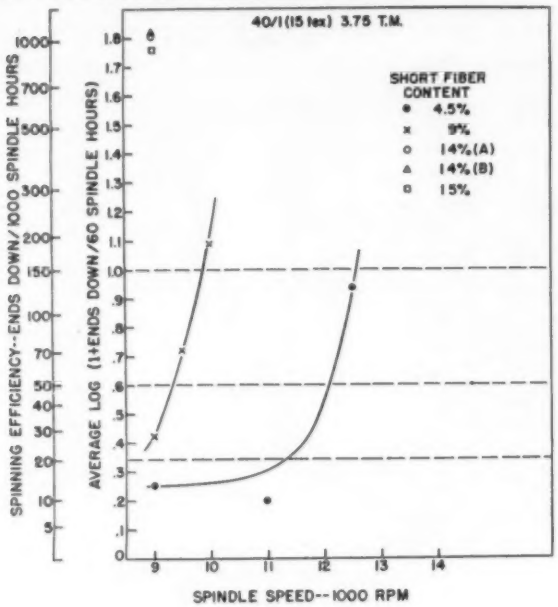
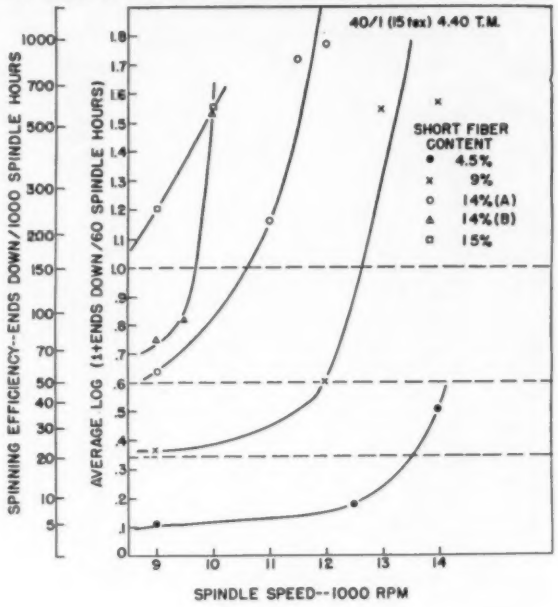


Fig. 1D. The effect of spindle speed on spinning efficiency for the five levels of short-fiber content—40/1, 4.40 TM.



4.40 TM, where all the cottons with the varying short-fiber contents spun approximately equal (at 9000 rpm). At the 3.75 TM, the end breakage of the 9% cotton diverges sharply from the 4.5% cotton so that at about 12,000 rpm it is unspinnable, while the 4.5% cotton has an ends-down rate below 20/1000 spindle hours.

Alternatively, it may be seen that for an ends-down rate of 50/1000 spindle hours the estimated speeds for these two cottons at 3.75 TM are 10,500 and 13,500 spindle speeds, respectively; while with the 4.40 TM the speeds are 13,200 for the 9% cotton and an indeterminate high value for the 4.5% cottons. An identical pattern may be observed for the 40/1 yarns in *Figures 1C* and *D*, except that the critical speeds are lower than was the case for the 30/1.

Looked at in another way, for the 9% cotton within the 30/1 and 40/1 yarns and for the performance indicated in *Figure 1*, a 5% to 8% increase in production at a constant ends-down rate of 50/1000 spindle hours could be achieved by an increase in twist multiplier from 3.75 to 4.40 with a concomitant spindle speed increase. Thus, this example shows that for this level of short fiber content it would be profitable to increase twist and speed.

The following general conclusions can be drawn:

1. Yarn breakage increases with decreases in twist and is more marked as short fiber content increases.

2. Yarn breakage increases with decreases in yarn size and the increase is more marked as short fiber content increases.

3. Yarn breakage increases with increases in spindle speed and the increase is more marked for the higher short-fiber-content cottons.

4. The effect of spindle speed on yarn breakage is curvilinear, with the greater degree of curvilinearity obtained for the cottons with the higher short-fiber content.

Thus, cottons of high short-fiber content display greater sensitivity to changes in spindle speeds, yarn size, and twist than do cottons containing low percentages of short fibers.

The end breakage data show that short-fiber content, within the limits evaluated, is not critical for 30/1, and presumably coarser, yarns of maximum strength twist, spun at spindle speeds of 11,000 rpm or less. Conversely, these results also imply that for fine or low-twist yarns, selection and use of cottons with low short-fiber content would be profitable since these cottons would permit spinning at much higher speeds.

While these experiments were conducted only on carded yarns, it seems probable that had the high short-fiber-content cottons been combed to reduce their level to approximately that of the low short-fiber-content cottons, comparable spinning performance might be expected. Thus, for a mill seeking to spin fine or low-twist yarns at the maximum possible spindle speed the results obtained in this investigation point up the attractiveness of either (1) selecting cottons of low short-fiber content initially, or (2) seeking means to reduce the short-fiber content, which in the present state of the art would seem to mean combing. Also, for a mill spinning a diversity of yarn sizes and twists proper consideration of short-fiber content and the allocation of appropriate cottons to the various mixes should increase over-all spinning efficiency.

In addition to the ends-down test, the yarns produced were tested for skein strength, single strand strength and elongation, uniformity, and appearance. Selected properties for the yarns spun from the lowest, intermediate, and highest levels of short-fiber contents are shown in *Table 2*.

TABLE 2. Selected Properties of 30/1 (20 Tex) and 40/1 (15 Tex) Yarns Spun at Specified Twists and Spindle Speeds from Acala 44 Cotton of Three Levels of Short-Fiber Contents

Yarn No.	TM	Spindle Speed 1000 rpm	Single Strand Tenacity g/tex	Single Strand Elongation %	Uniformity[1] CV %	Yarn Appearance grade
			4.5% SHORT FIBERS			
30/1	3.75	9.0	15.2	6.62	20.1	B—
		12.5	14.7	5.80	19.9	B—
	4.40	9.0	16.1	7.15	20.7	B—
		12.5	16.0	6.12	20.4	B—
40/1	3.75	9.0	14.0	6.20	21.7	B—
		12.5	14.1	5.40	21.1	B—
	4.40	9.0	15.2	6.62	21.7	C+
		12.5	14.8	5.52	22.2	B—
			9% SHORT FIBERS			
30/1	3.75	9.0	12.2	6.40	22.8	D+
		12.0	12.0	5.52	22.5	D+
	4.40	9.0	13.5	6.95	23.6	C—
		12.0	13.5	6.35	23.4	D+
40/1	3.75	9.0	11.2	5.86	23.4	D+
		10.0	11.3	5.80	22.9	D+
	4.40	9.0	12.4	6.20	24.6	D+
		12.0	12.3	5.66	26.0	D+
			15% SHORT FIBERS			
30/1	3.75	9.5	10.5	5.80	27.8	D
	4.40	9.0	11.9	6.50	27.6	D
		12.5	11.6	5.75	27.8	D
40/1	3.75	9.0		Unspinnable		
	4.40	9.0	10.6	5.73	[2]	D
		10.0	10.7	5.34	29.7	D

[1]Uster tester with quadratic integrator at 8 yd/min.
[2]Over 30%, the upper limit of instrument.

Short-fiber content appears to directly affect yarn uniformity, tenacity, and appearance, as has been noted in other work (2, 4, 5, 6). On the other hand, spindle speed appears to have slight, if any, effect on these properties while having a marked effect on elongation. The decreased elongation with increased spindle speed is attributed to the greater tensioning of the yarn during spinning. It should be borne in mind, however, that the same size traveler was used for all twists and speeds of a given size yarn.

The skein data showed a substantially similar pattern to the single strand data and are not presented here.

Conclusions. A series of spinning tests showed that the relationship between spinning efficiency and short-fiber content, for print cloth yarns (30/1 and 40/1), is complex and strongly influenced by spindle speed, yarn size, and yarn twist. Increases in short fiber content, in general, seriously decrease spinning efficiency. Further, it appears that when a cotton of a given level of short-fiber content exceeds an ends-down rate of about 20/1000 spindle hours, end breakage increases exponentially with increases in spindle speed.

Because of the strong interactions among short-fiber content, spindle speed, and yarn size and twist, the adverse effects of high short-fiber content of a cotton can be minimized by allocating it to 30/1, or presumably coarser, yarns spun at the twist for maximum strength. Similarly, for a given size yarn and spindle speed, the lower short-fiber-content cotton should be allocated to the filling twist yarn.

As had been previously reported, increases in short-fiber content adversely affect the uniformity, appearance, and strength of cotton yarns.

Acknowledgment

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A new cotton trashmeter

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THE DEPARTMENT of Agriculture has been interested in the precise measurement of color and of the amount of trash on the surface area of cotton samples for many years in connection with its cotton grade standards program. A visual disk colorimeter, successfully developed about 1929, was used until 1950 when it was re-

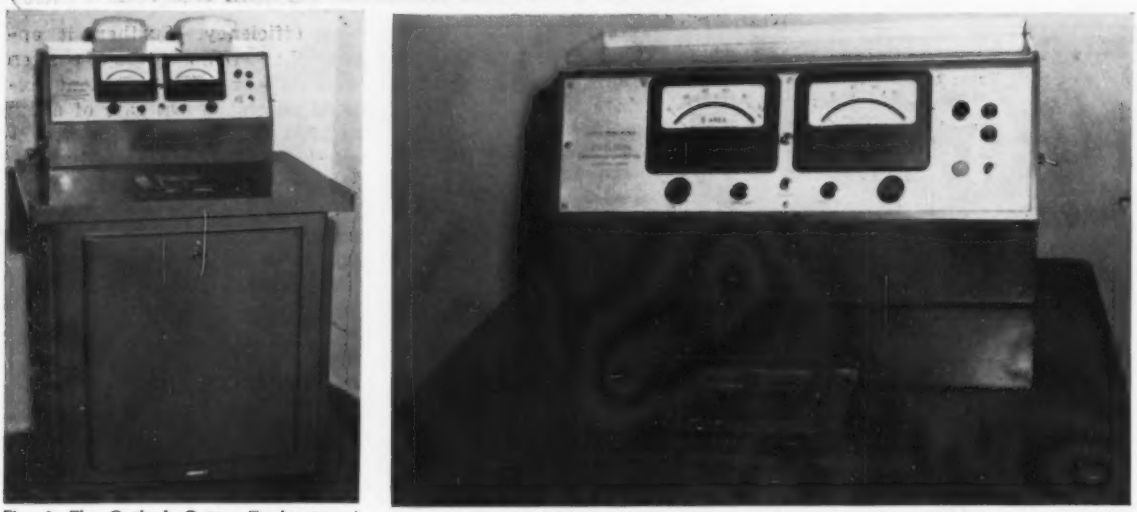

Fig. 1. The Outlook Cotton Trashmeter. A full view of the instrument is shown in the photograph at the left; in the photograph at the right is shown a close-up of the working surface of the instrument.

placed with an electronic instrument.

It may be of interest to note that emphasis on early electronic instrumentation was directed primarily toward measurement of trash, and that work on an electronic colorimeter evolved later. In the period 1938 to 1941, D. Nickerson and C. M. Asbill, Jr.,* designed and built a device called a "grade scanner" which employed a moving spot of light, about 1/64" in diameter at slow speed, ¼" in diameter at fast speed, which scanned a path across the face of cotton samples in a box of grade standards. The light and dark areas encountered by the spot of light were directed to a photocell, the signal was amplified, and automatically recorded on a chart.

The device was successful in providing a record of the light and dark areas across the sample, but the amount of time required to make readings with the small spot was about two minutes per sample for scanning a single path, and it was also a long and laborious process to interpret the charts. Work began on automatic interpretation of chart results, but was interrupted by the war in 1941.

During the war years so many advances were made in electronic techniques that work on the scanner was suspended until advantage could be taken of these newer techniques. Meanwhile, color measurement was proving to be such a useful aid that visual methods were no longer adequate, and work began on the development of an automatic, self-standardizing electronic colorimeter. The Nickerson-Hunter Cotton Colorimeter that came into use in 1950 provided the first automatic device we know of that would measure cotton color rapidly and accurately. Following successful development of this cotton colorimeter, attention again was turned to a scanner for providing information about trash on the surface of cotton samples. It was intended that this trash scanner would be a companion to the colorimeter, and that it would operate rapidly enough to measure the surface trash on every sample of cotton put into grade standards boxes, just as color is measured for every sample.

Until very recently the Shirley Analyzer provided the only practical method by which the foreign-matter content of lint samples could be measured. This device is slow and expensive, and although it does a fairly good job of physically separating lint from foreign matter, it does not evaluate leaf or trash content in a sample of cotton as the classer does. A surface measure of leaf content would be more useful in our standards work to help maintain uniformity of grade standards than a measurement of trash by weight of non-lint for each bale, as given by the Shirley Analyzer.

Development of the Trashmeter. By 1954, when attention again was turned to trash measurements, television scanning methods were well known and were beginning to be applied in many commercial fields. After investigating the practicability of employing such methods in a cotton trashmeter, performance specifications for a device were developed. Specifications provided that the instrument be designed on the principle of television scanning, with a signal utilization system to provide two readings, one a measure of the total area of trash (dark areas) on a given surface, the other a reading to provide a measure of the number of trash (dark) particles on a given surface. Provision was to be made for adjustment of the reflectance threshold level at which separation would be made of "trash" or "dark" particles against the lighter background color of lint cotton, and that it should scan an area about 4" x 4", and measure particles as small as 0.01" with a precision of ± 0.005".

In 1956 a contract was let to the Outlook Engineering Corp. of Alexandria, Va., and they built and delivered an instrument employing a Vidicon tube as the sensing device. Many difficulties were encountered in keeping this instrument calibrated; it lacked stability, was sensitive to background color, and in fact proved unsuitable

*Then on the staff of USDA's laboratory at Clemson, S. C.; now with North Carolina State College School of Textiles.

for our use. Briefly, it would not measure what we thought it should without employing an electronics technician to operate and maintain it.

With this experience, and at the request of the contractor, specifications were modified to allow use of an optical-mechanical scanner instead of a Vidicon tube. The result could be called a sophisticated, modernized version of what had been the original Nickerson-Asbill idea.

Principle of the Trashmeter. This instrument, the Outlook Cotton Trashmeter to be discussed, was delivered about a year ago and was accepted (June 1959) after tests showed that it met the service requirements of the contract. Evaluation has continued since then.

The instrument scans 1,000 lines per frame at a speed of 345 lines per second. The width of scan is 0.004". It requires about three seconds to scan a 4" x 4" sample of cotton as compared with the almost "instantaneous" scan provided by the Vidicon tube. Results are indicated on two meters that are located on the top of the machine at the back. One meter indicates the fraction of the total area of a sample surface occupied by the dark areas of trash, and the other gives an indication of the relative number of particles (actually it counts the number of times the scanning spot crosses a light-to-dark boundary). A compensating circuit automatically adjusts for imperfections in illumination.

The level of reflectance at which the dark particles will be counted is adjusted by a threshold control. The shaping and modification of the signals passing through the threshold level eliminate the effects of background color, as well as variations in the level of reflectance provided by the trash particles themselves.

A close view of the working surface of the trashmeter is shown in *Figure 1.* This illustrates the position of the sample window and the two meters above it on which results are indicated for "Per Cent Area" and "Relative Count."

Test Results. One of the first and most important problems with the instrument was the development of a calibration method that would enable us to maintain a uniform level of results. Changes in threshold levels occured through the aging of illuminating lamps, changes in tubes, and in the accumulation of dust on the surfaces of the scanning mirrors. To check the calibration, a series of standard papers was prepared, each paper having different sizes and numbers of black dots, some on different background colors. These papers were somewhat of a makeshift standard, but they have served to help in making the initial evaluations of the instrument.

Figure 2 and *Table 1* illustrate the precision of the instrument as measured by successive readings over a 30-day period on this series of calibration papers. While the precision reported is sufficient for a first instrument, it leaves a great deal to be desired in a perfected instrument.

Between area and count readings a closer correlation exists than we wish, but through some redesigning it seems certain that this can be taken care of more adequately in a second instrument. In contrast to results obtained on the first model in which a Vidicon tube was used, differences in background color no longer influence meter readings, as shown by measurements for papers numbered 2, 3, and 4. These papers have the same number and size of dots, but they vary in background color

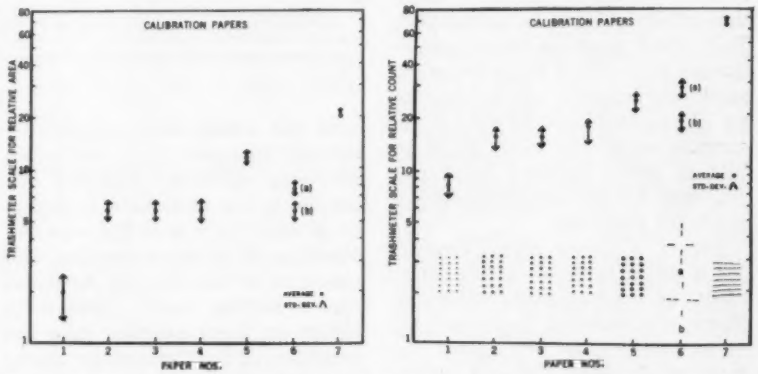

Fig. 2. Precision of measurements on Outlook Cotton Trashmeter. Averages, ± one standard deviation, of measurements on calibration papers, for relative area (left) and for relative count (right). Measurements repeated over a 30-day period. A sketch of the papers used in this experiment is shown in the figure at the right; papers numbered 2, 3, and 4 have the same number and size of dots, but different background colors.

TABLE 1. Precision of Measurements on Outlook Trashmeter[1]

Calibration Papers				Results			
				Relative Area		Relative Count	
No.	No. Dots	Size In.	Prod. No.	Avg	Std. Dev ±	Avg	Std Dev ±
1	21	1/32	3831	2	0.6	8	1.2
2	21	3/64	3831	6	0.9	15	1.9
3	21	3/64	3832	6	0.8	15	1.6
4	21	3/64	3833	6	0.9	17	1.9
5	21	1/16	3831	12	1.3	24	2.6
6a	6 thin lines 1/32" x 1/4"		3832	8	0.8	29	2.0
6b	Same as 6a oriented 90°			6	0.7	19	2.0
7	91	3/64	3831	22	1.5	71	3.9

[1]Averages and standard deviations of 30 repeat measurements taken over a 30-day period on standard calibration papers.

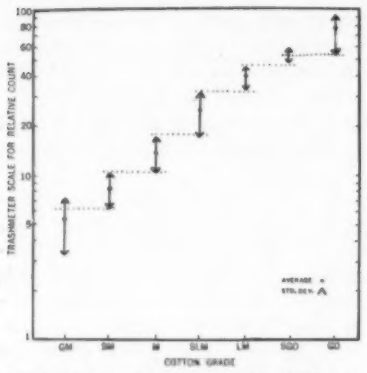

Fig. 3. Precision of measurements of Outlook Trashmeter on identical cotton samples. Averages ± one standard deviation for 30 repeat readings taken over a period of one month on each of the six samples in each grade.

TABLE 2. Precision of Measurements of Outlook Trashmeter on Identical Cotton Samples[1]

Grade	Relative Area Avg	Relative Area Std Dev ±	Relative Count Avg	Relative Count Std Dev ±
White				
GM	1.1	0.5	5.6	2.3
SM	2.5	0.7	8.5	2.1
M	3.7	0.9	13.9	3.1
SLM	6.9	1.7	25.4	5.6
LM	11.3	1.7	38.8	5.4
SGO	17.1	2.5	53.7	6.5
GO	23.3	4.4	77.9	13.4
Spotted				
SM Sp	3.4	1.1	13.1	4.0
M Sp	5.4	1.6	19.7	5.9
SLM Sp	11.9	2.3	38.7	7.9
LM Sp	22.4	3.5	67.6	9.8
Tinged				
SM Tg	2.3	1.1	10.1	4.4
M Tg	6.7	1.5	24.0	6.2
SLM Tg	12.3	3.1	42.1	11.4
LM Tg	20.7	3.0	65.3	10.8

[1]Averages and standard deviations for 30 repeat readings taken over a period of one month on each of six samples in each grade.

within the color range of American cottons.

Results for paper No. 6, which contains six short thin lines, show the effect of sample orientation. This effect is of no major consequence with cotton if leaf areas are randomly oriented, but it might be an important consideration in samples containing grass, bark, or bits of stems if there were any tendency toward parallelization of the trash particles.

Figure 3 shows typical results for a series of repeated measurements on a set of grade standards. These are repeated measurements on an identical set of samples that were made over a period of approximately one month. Similar measurements made over many months follow the same pattern. Because of the close correlation between area and count measurements, results are illustrated in *Figure 3* for count only.

Data for area as well as count are reported in *Table 2*. The standard deviation reflects a combination of the variability introduced both by the instrument and by the sample. However, even with this degree of variation there is a fairly sharp distinction between measurements for the various grades tested.

Figure 4 illustrates test results obtained on many samples taken from the same bales, as measured on the Outlook Trashmeter and on the Shirley Analyzer. For this test 30 samples were selected throughout each of several grade standards bales; tests were made on both the Trashmeter and on the Shirley Analyzer. The variation, involving different samples but limited to the same bale, is slightly greater than it is for repeated readings on the same samples. The precision of the Shirley Analyzer measurements seems somewhat better on these samples than the precision of the Trashmeter measurements, but in partial explanation it should be noted that the Shirley Analyzer uses a much larger sample, also that not as many different bales were used in tests made with the Shirley Analyzer as with the Trashmeter *(Table 3)*.

During the 1959 crop year, Trashmeter and Shirley Analyzer tests were made on all samples collected for our Annual Fiber and Processing Quality Survey (1)[3]. This survey included several hundred spinning test lots from all of the major cotton producing

[3]Numbers in parentheses designate references at the end of the paper.

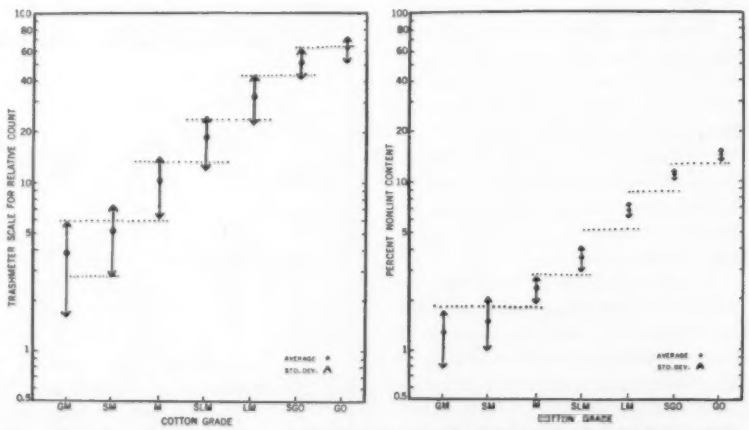

Fig. 4. Comparison of variability of measurements on Outlook Trashmeter and Shirley Analyzer for samples within the same bales. Average, ± one standard deviation, for 30 samples from each of several bales of cotton (Trashmeter, 50 bales; Shirley Analyzer, 15 bales).

TABLE 3. Variability of Measurements of Outlook Trashmeter and Shirley Analyzer for Samples Within the Same Bales[1]

Grade	Outlook Trashmeter				Shirley Analyzer	
	Relative Area		Relative Count		Nonlint Content, %	
	Avg	Std Dev ±	Avg	Std Dev ±	Avg	Std Dev ±
GM	0.8	0.6	4.0	2.4	1.2	0.4
SM	1.0	0.7	5.4	2.5	1.5	0.5
M	2.9	1.6	10.8	4.5	2.3	0.4
SLM	5.1	2.5	19.0	6.6	3.5	0.6
LM	10.8	3.6	35.3	10.7	6.6	0.7
SGO	16.4	4.7	55.5	12.2	10.7	0.7
GO	21.8	4.5	68.6	12.0	14.2	1.0

[1]Averages and standard deviations for 30 samples from each of several bales of cotton (Trashmeter, 50 bales; Shirley Analyzer, 15 bales).

areas in the United States, collected at periodic intervals throughout the harvesting season. For inclusion in this report, test results have been selected for 25 samples taken at random from each grade.

Means and standard deviations, computed for measurements made on these samples on the Outlook Trashmeter and on the Shirley Analyzer, are illustrated in *Figure 5*. These results show that the Trashmeter measurements provide a sharper distinction between grades than measurements made on the Shirley Analyzer, for there seems to be less overlap between grades as measured on the Trashmeter than for those measured with the Shirley Analyzer *(Table 4)*. One may conclude from this that the Trashmeter sees cottons more like the classer does.

These results are encouraging and we believe that refinement of test procedures and calibration techniques should make it possible to improve on the precision reported. During the coming season evaluation of the instrument will be continued in greater detail. It is confidently expected, once we adopt suitable scale levels for reporting measurements, that this instrument will prove a valuable companion to the colorimeter in our standards and cotton classing programs. This instrument could also be useful to those who are interested in obtaining a rapid measure of relative trash content without destroying the sample.

In closing, we wish to mention that we also are evaluating the small Fractionator (2) recently developed by the ACCO Laboratories at Houston, Texas, and are most enthusiastic about its possibilities. From *Figure 6* it can be seen that the preliminary measurements made in our laboratories on this instrument agree closely with those made on the Shirley Analyzer. This device has been greatly improved since the original model was built, and we are awaiting receipt of an improved model with considerable interest, for we plan to run parallel tests during the 1960 season on it, on the Outlook

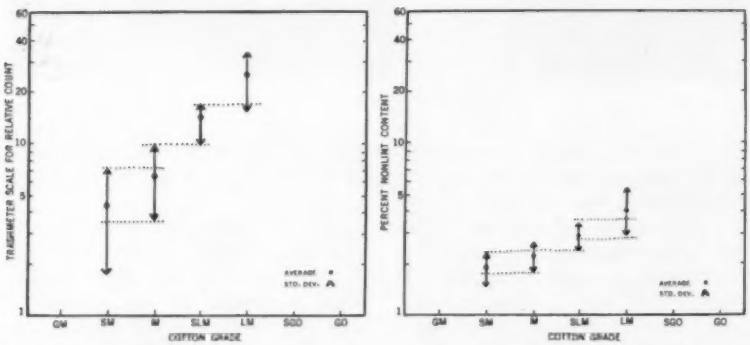

Fig. 5. Comparison of variability of measurements of Outlook Trashmeter and Shirley Analyzer for samples called the same grade. Averages, ± one standard deviation, for 25 samples of each grade selected at random from 1959 Annual Quality Survey samples.

TABLE 4. Variability of Measurements on Outlook Trashmeter and Shirley Analyzer for Samples Within the Same Grade[1]

Grade	Outlook Trashmeter—Count				Shirley Analyzer	
	One Reading		Two Readings		Nonlint Content, %	
	Avg	Std Dev ±	Avg	Std Dev ±	Avg	Std Dev ±
SM	4.7	3.2	4.8	3.1	1.9	0.4
M	6.8	3.4	6.8	2.7	2.2	0.4
SLM	13.8	3.7	14.7	3.8	2.9	0.5
LM	26.7	11.3	24.8	10.1	4.0	1.2

[1]Averages and standard deviations for 25 samples selected at random for each grade from 1959 Annual Quality Survey.

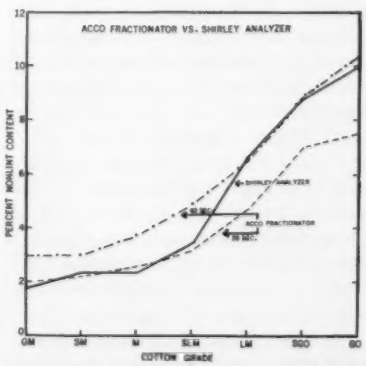

Fig. 6 Measurements of nonlint on the Acco Fractionator and on the Shirley Analyzer for the same cottons; averages for five cottons of each grade.

Trashmeter, and on the Shirley Analyzer.

References

1. "Annual Cotton Quality Survey, Summary of Results of Fiber and Processing Tests from Selected Market Areas, Crop of 1959," U. S. Department of Agriculture, AIB No. 227, April, 1960.

2. Berkley, E. E., "Progress of Instrumentation for Selecting Cotton for Specific End Uses," paper presented at ACMI Open House, Clemson, S. C., April 15, 1959.

Design, construction, and performance of the Saco-Lowell/Uster Versa-Matic ADC drawing frame

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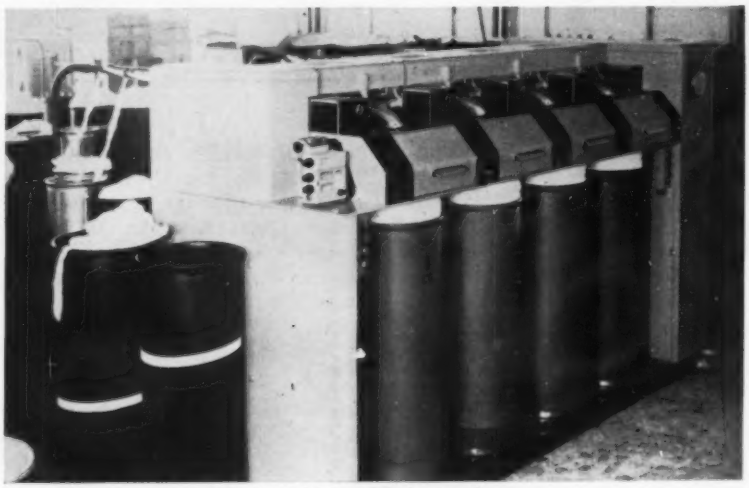


The Versa-Matic ADC drawing frame.

THE CHARACTERISTIC of a uniform strand has been the goal through all the years during the evolution of the processing of yarn. The basic principles of strand evening were utilized by the operators of the old wool and flax spinning wheels. In those instances the operator sensed or measured the cross section of the finished strand by either sight or feel and, through a mental process, relayed to the fingers of the selecting and holding hands the necessary impulses to produce relatively satisfactory yarn.

All during the era of mechanization of textile processing, attempts have been made to increase uniformity by automatic control devices. Notable examples of such devices were the roll-type and pedal-type evener motions on pickers, which were brought out in the eighteen hundreds. Other attempts to gain more uniform weight of the output were the railway head and its more refined version, the evener drawing frame, both in common use at the end of the nineteenth century and at the start of the present century.

Patent records indicate innumerable arrangements claiming improved uniformity of sliver. All of these devices, for one reason or another, either enjoyed a rather limited use span or were never accepted because of impracticability.

In 1948, the first electronic evenness tester was placed on the market by Zellweger, Ltd., of Uster, Switzerland. It goes without saying that this type of measuring device, which utilizes electric capacitance as the sensing means, has become the standard tool of quality control people throughout the world.

As a logical sequel to this development, a mutual agreement was entered into in 1953 by Saco-Lowell and Zellweger to combine the proven qualities of the electronic measuring equipment with suitable control devices and to build these into a production drawing frame. Since that date, constant application to the project has resulted in the design and building of five different models, culminating in the high-production, quality-producing frame recently shown at the American Textile Machinery Exhibition and which is the subject of this paper.

Specifications. In setting up specifications for the design of this drawing frame, the following conditions were considered mandatory:

First, the system should be truly automatic in its control over a wide range of weight variations, including those of extremely short term.

Second, since the development of a regular-style, high-production drawing frame was then under way, a design for an automatic control system was required which would not place a limitation on the contemplated delivery speeds.

Third, the frame should demand no extra skill or knowledge on the part of operators.

Fourth, the amount of maintenance and time required for it should be kept to a minimum.

Operating Principle. Let us go over the operating principle of the ADC system for a moment. The combination of letters "ADC" is a registered trademark standing for "Automatic Draft Control." Referring to *Figure 1,* a schematic diagram of the servo-control, you will see a drafting element consisting of four lines of rolls. This drafting element feeds a pair of calender rolls associated with a convention-

al coiling mechanism. The total draft in this element is divided into two important drafts plus a tension draft. The main draft takes place between the third and fourth rolls and constitutes the main reduction with a value primarily dependent upon the number of slivers fed. The center zone between the second and third rolls is occupied by the sensing or measuring device and utilizes only a tension draft. The front zone between the first and second rolls is the variable draft zone with a mean draft in the order of 1.25. The customary tenson draft also occurs between the front roll and the calender rolls.

The stock in process, on passing through the sensing zone, excites a transducer of the capacitance type which produces a signal in proportion to the weight per unit length. This signal is to control the correction of the measured strand. To accomplish this, it is necessary to delay the signal to allow the material time to pass from the measuring head to the zone where the correction is to take place. A time delay circuit, therefore, is incorporated to condition the measuring head signal which then becomes the basic signal controlling the rpm of the front roll.

This front roll speed can be made to vary ± 20% from the mean; so, it is possible to correct weight variations within that range. To insure proper correction, the circuit is of the closed loop design with a signal also being supplied from a tacho-generator driven in synchronism with the front roll. This signal is combined with the time modified transducer signal in what may be called an error detector.

Because of other variable conditions brought about by outside influences, such as possible speed variations in primary driving means, there is an additional closed loop circuit. This also feeds to the error detector a modifying signal from a tacho-generator coupled with the constant speed members of the frame.

The circuit thus far described would suffice to correct for variations of relatively short term. To insure compensation for long term variations, another, and perhaps the most important, circuit and

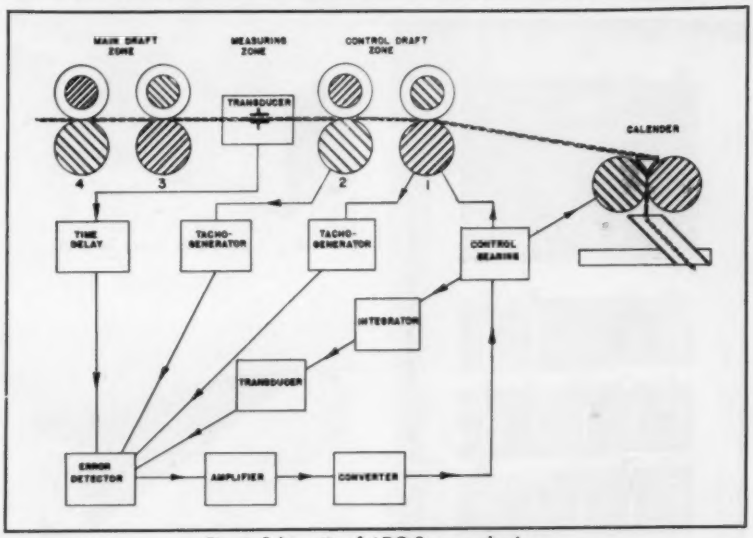


Fig. 1. Schematic of ADC Servomechanism.

control has been incorporated. This arrangement, consisting of an integrator and transducer, also serves to eliminate other disturbing influences which would tend to have long term effects; such influences might be excessive temperatures or humidity changes. In practice, this circuit constantly maintains a base or average value about which the corrections are made. With the modification of the basic control signal from the measuring head having been completed, by the contributions from the several loops, the signal is then amplified to a suitable value for control purposes and fed to magnetic converters regulating the control gearing.

It should be clearly understood that this ADC unit is not intended for the production of a sliver of any predetermined fixed value of weight per unit length. It is, however, capable of producing sliver which possesses unusually high uniformity of weight per unit length over the ranges where we have become accustomed to short, medium, and long term deviations.

In order to get an idea of the range of sliver length over which correction can be expected from the ADC unit, let us suppose a frame is running at a speed of 400 fpm. With response time of the control devices assumed at 20 cycles per second, any deviations represented by approximately a 4″ period on a Spectrogram could be expected to be corrected. On the same speed basis, and with the present long-term controls, sliver lengths of approximately 200 yards come within the surveillance of this unit, and correction within the limits of ± 20% will be imposed.

Summing up the salient features of the ADC controls, we might list the following:

1. High-accuracy measurement of variations
2. Precise control of time delay
3. Very fast response
4. Continuous establishment of an average value about which corrections for uniformity are made

Design. Because all back stock is not identical, it is necessary to measure and control each delivery of the draw frame separately. To insure this individuality, we have separated the control components, placing the measuring heads and control gearing on a delivery basis. The electrical controls for the ADC, however, are located in a central cabinet at the rear of the frame *(Figure 2)*. In this lint-tight cabinet are located plug-in units consisting of a power supply, a supervision set, and sets of five each of amplifier and time delay units, one each of which is a spare *(Figure 3)*. These units are fully transistorized to insure long, trouble-free life. The cabinet can be closed and locked, if desired,

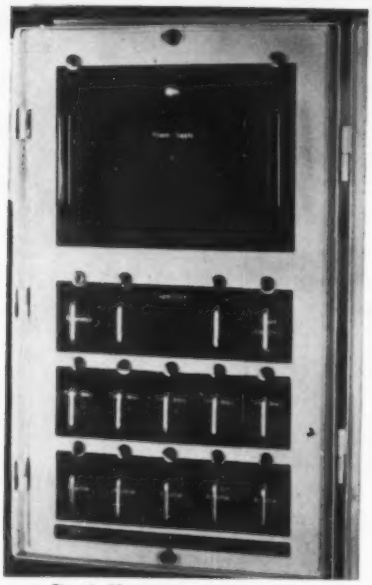


Fig. 2. Electronic control cabinet.

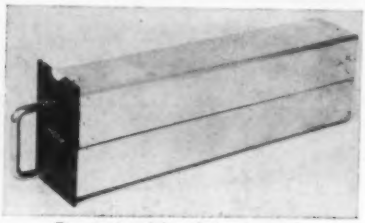


Fig. 3. Amplifier (plug-in unit).

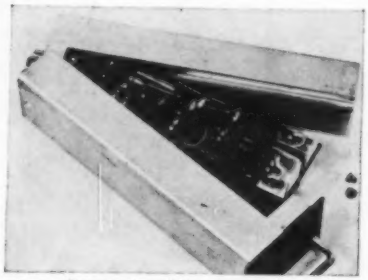


Fig. 4. Amplifier (opened).

Fig. 5. Control Gear boxes.

since adjustment is required only when setting up for different back stock.

The measuring heads, one for each delivery, are easily demountable units fitting between the second and third top rolls and plugging into concealed wiring brought up through the roll stands. Each delivery also has its own set of control gearing enclosed in a cast box which acts simultaneously as a roll stand *(Figure 5)*.

There is a common input drive to all control gear boxes, but the output of each drives its particular front drafting roll and calender roll. The gear boxes are totally enclosed and are continuously lubricated with oil recirculated from a reservoir located beneath the roller beam.

Because of the extremely fast response necessary to compensate for short term variations, you can well imagine the problems imposed with respect to inertias. Due to the necessity of keeping rotating masses at a minimum, it was not practical to utilize individual electric motors for control actuation, so a completely new component was devised. Two of these magnetic converters, which—inherent with their design — possess minimum inertias, are incorporated in each control gear unit. These are used in connection with a so-called control differential unit which in turn modifies the output of the so-called power differential to accelerate or decelarate the front drafting rolls and calender rolls as required.

Wherever possible, rotating weight has been kept to a minimum and antifriction bearings have been incorporated to minimize inertias and friction. Also incorporated with and located on the front end of each gear box is an indicator. In addition to allowing a visual check on individual delivery operation, this also embodies electric contacts which serve to automatically stop the frame when some uncontrollable influence is in effect, tending to make the sliver either excessively heavy or light.

Figure 6 is a block diagram showing the various components of the control gearing in relation to the drafting rolls and calender rolls. "A" represents the "power" differential. "B" represents the "control" differential, one output of which is transmitted through the reduction gearing "C." The output shafts of the control differential are connected to the magnetic converters "D" and "E."

Briefly, the sequence of motivation of this system is as follows: The main drive comes from the constant speed second drafting roll and serves as the primary input to both differentials. The magnetic converters, through the electronic controls, modify the output of the control differential which, through the gear reduction unit, produces the variable input to the power differential. The output of the power differential then drives, in synchronism, both the front drafting roll and the calender rolls.

To understand the action of drive variation, let us first assume that the delivery is operating at its mean speed which would be true if an absolutely uniform web were passing through the measuring zone. In this case, each magnetic converter would be energized by a certain voltage which would allow a proportionate slippage of the two output shafts. The resulting output through the gear reduction unit would then serve to

establish the output of the power differential such that the mean draft of 1.25 occurs in the correcting zone.

Now let us assume that the web in the measuring zone became lighter in weight. The resultant change in electronic signal would vary the distribution of energy to the magnetic converters with the result that converter "D" would allow increased slippage and converter "E" decreased slippage, which would cause less input from the reduction unit to the power differential. The effect would be to slow down the output to the rolls, thereby reducing the control draft value to compensate for the lighter weight of the stock previously measured. For a condition where the measuring head senses a heavier web, the opposite distribution of energy to the converters takes place which serves in like means to speed up (increase) the control draft.

It goes without saying that all the latest regular Versa-Matic features, such as unit gearing, overarm weighting, stop motions, optional mechanical or pneumatic clearers, and the like, have been retained in this new frame.

The basic frame size of this machine remains unchanged compared to the regular Versa-Matic. However, important savings of floor space can generally be realized, particularly in some instances when only four cans per delivery are required in the creel.

While total power for the frame will vary with the type of clearers and the operating speed, the additional power required due to the ADC controls is only about 100 watts per frame. No special power line to the frame is required since the control voltage is taken from the 200- to 600-volt main line to the motor starter. Supply voltage fluctuations of ± 10% are accommodated by adequate stabilizing means built into the controls.

Operation. Setting up an ADC draw frame for a particular stock entails little more trouble than a conventional frame. The draft for the main draft zone must be determined and geared as usual. The optimum roll spreads for the staple and bulk being handled take the normal procedure. Next, the

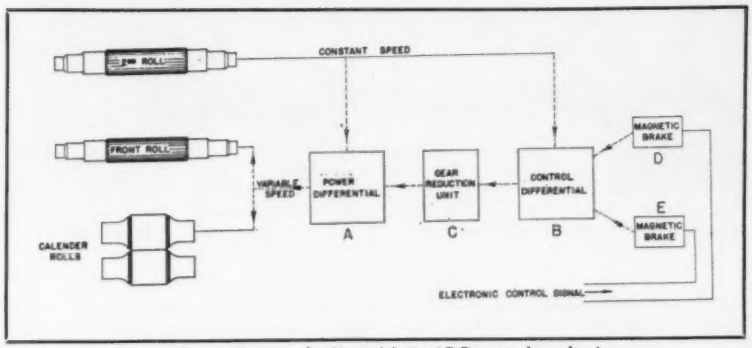


Fig. 6. Power diagram for Versa-Matic ADC control mechanism.

adjustment for the sensitivity of control must be done by manipulation of the knobs in the control cabinet. There is one knob for each delivery. A sliver chart must be made on one delivery and the knob setting noted. The knob setting should then be changed. A sliver chart for that setting will then show the trend to be either an improvement or an impairment. One additional chart will usually, with a little experience, fix the optimum setting after which the remaining knobs can be set to conform. Such adjustments would be required only with a substantial change in the stock being run. No attention to adjustments is required by the operator during normal operation and controls are identical with any regular Versa-Matic frame.

One additional signal light which monitors the ADC components has been added to the usual complement of stop motions. In the event the frame is automatically arrested because of some abnormal condition or malfunction of the controls, the operator has only to scan the indicators which, as I described previously, are mounted on the front of each gear box. The position of the pointers will identify the delivery at fault.

Possible conditions which might operate to cause stoppage of the frame are back stock weight variations in excess of ± 20%, an accumulation of lint or tufts of fibers which may have become lodged in any of the measuring heads, or electrical or mechanical failure of some control component.

Maintenance. Maintenance has received much consideration in the design and has been simplified from the mill standpoint. The mechanical components are enclosed in dust-tight cases and run in oil with only an occasional oil change being required. The more complex mechanical and electromechanical components are designed into easily removable interchangeable units which require a minimum of time to exchange.

Figure 7 shows the power differential, which is typical of the

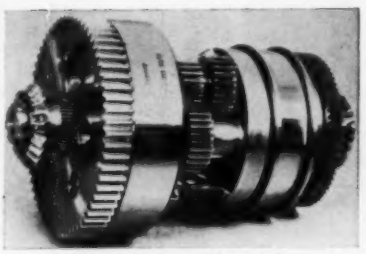


Fig. 7. Power differential.

unit construction. The electrical controls likewise, as previously mentioned, are designed as plug-in units with spare amplifier and time delay units already incorporated in each cabinet.

It is recommended that a mill keep in store spares of the various units to allow quick replacement and minimum down time for any machine. Should a replacement be required, the mill would easily install it and return the faulty component to the manufacturer's repair station where expert repairs and inspection could be performed. A check by a technician for any elusive frame or component difficulties is made quickly and conveniently by a plug-in connection built into the supervision unit to accommodate any instrumentation required.

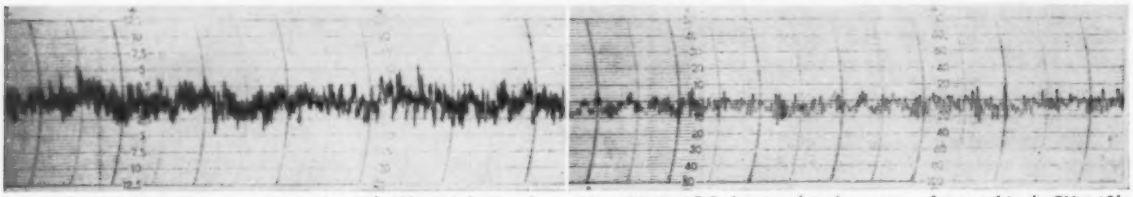
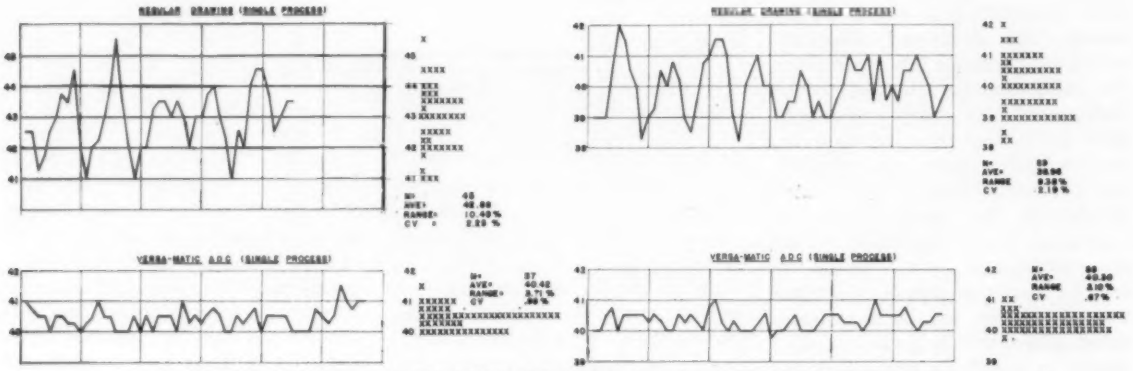
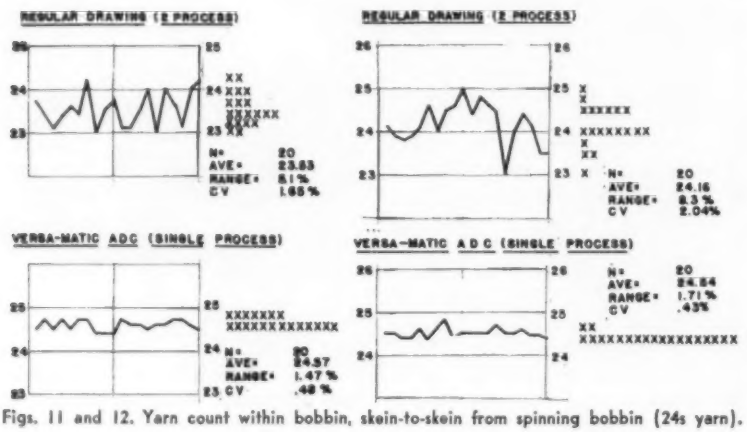


Fig. 8. Typical Uster evenness tester charts (25% scale). Regular drawing (second process after combing), CV 2.8%, at the left; Versa-Matic ADC drawing (single process after combing), CV 1.6%, is at the right.



Figs. 9 and 10. Yarn count within bobbin, skein-to-skein throughout spinning bobbin (41s yarn).



Figs. 11 and 12. Yarn count within bobbin, skein-to-skein from spinning bobbin (24s yarn).

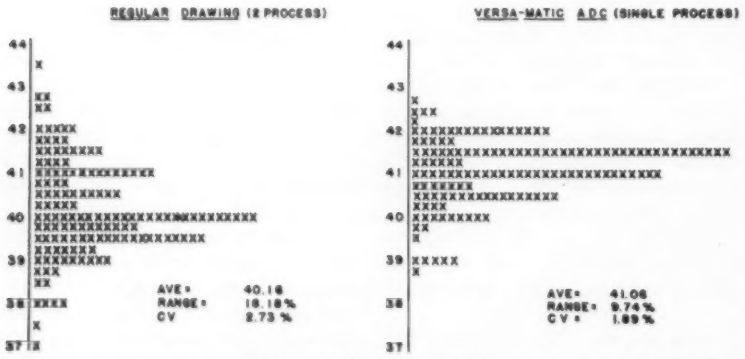


Fig. 13. Yarn count between bobbins, single-skein weight from each of 144 bobbins (41s yarn).

Performance. With the utilization of the Versa-Matic ADC frame, reductions in short term variations of drawing sliver can be made from a normal CV of 2.5% to 3.5% down to a CV of 1.5% to 2.0%. Typical of such results are the charts shown in *Figure 8*, which were run on the Uster 25% scale. The ADC frame also has the ability to hold or maintain remarkable uniformity of sliver over long lengths. This latter quality is reflected in a tremendous reduction in the long-range variation of the yarn.

While the number of mill trial installations, both in this country and abroad, have been relatively limited, we have obtained important results which I will touch on here. These results have been substantiated by tests of large poundage and show the following practical advantages which are to be gained through the use of ADC.

1. An important reduction of the CV of yarn numbers
2. An important reduction in the range of yarn numbers
3. A reduction of ends down at spinning
4. A reduction of re-ties at winding and fewer tailings at spooling
5. A reduction in the number of

stops in warping

6. A reduction in loom stops at weaving

From these improvements it will be seen that machine efficiencies will be increased with a consequent possible increase in the number of machines per operator. It has also been noted that in multiple-end knitting the use of ADC yarn has put an end to "tiger stripes." The increased uniformity of the ADC yarn would also be apparent in the weave of critical fabrics.

Referring now to *Figure 9* and *10*, we see plotted the results of actual mill tests depicting the variation of yarn numbers as run on comparative set-ups using a single process of drawing after combing. The "regular" drawing was Versa-Matic Model DC-7A (3 over 4). The figures for plotting were obtained by weighing consecutive skeins throughout spinning bobbins of 41s yarn from full to empty package. Results on this chart and those following have been randomly paired in order to facilitate visual comparison *(Figures 11* and *12)*. Particular note should be taken of the "range" values given in per cent of the average for each bobbin as well as the CV values which can be fully appreciated from the frequency distribution diagrams.

Figure 13 shows the frequency distribution plotted from yarn count values on a bobbin-to-bobbin (between bobbin) basis. The data were obtained by weighing one skein from each of 144 bobbins processed as noted. Again you will note an improvement in both range and CV. The illustrations shown are typical of performance. It should be emphasized that if one is to realize maximum benefits from ADC, and this applies especially to bobbin-to-bobbin uniformity, the picker laps must be relatively even and the roving and spinning operations must be well executed.

I am pointing out that adoption of the ADC system will not permit an easing of the maintenance schedule on machines used either before or after the drawing operation. I would also mention that the Versa-Matic ADC frame as now being produced finds its major application in the combed yarn organization. Modifications of the drafting element presently underway will greatly expand its application to carded work.

There can be no doubt that the high speed fiber processing equipment of the future is destined to be governed by a system of automatic draft control. I am happy to have had an opportunity to cooperate in the pioneering development of this ADC system which I believe is currently the most, if not the only really practical device covering such a broad corrective range on high-speed drawing operations.

● *See the September issue for the full text of more Cotton Research Clinic papers.—The Editors.*

There'll be lots to see in Greenville; show admission simplified

■ OF THE more than 350 suppliers to the textile industry who have contracted for space in the 21st Southern Textile Exposition to be staged at Textile Hall in Greenville, S. C., next October, about 230 firms did not participate in the show held last May in Atlantic City.

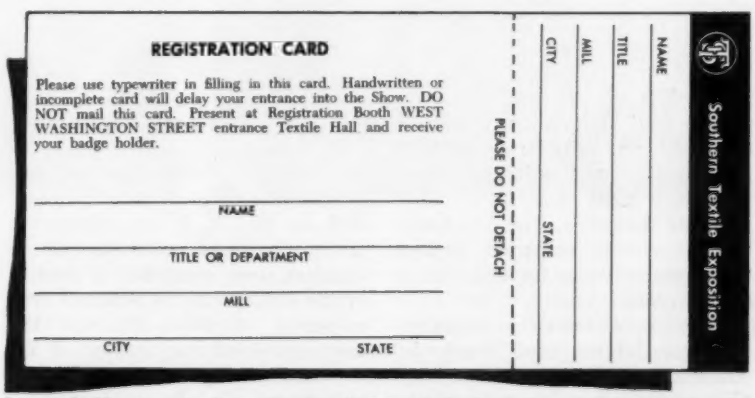
In light of the above information, which was obtained from an analysis of the list of exhibitors published by Textile Hall Corp. on June 1, mill men who have decided not to go to Greenville—thinking that they would see the same equipment and materials they saw in Atlantic City—may wish to reconsider the matter, as obviously Greenville will not be a "repeat" of Atlantic City.

In recent years each Greenville Show has been larger than the preceding one, the exposition in 1958 having attracted some 340 U. S. and foreign exhibitors. It is already assured, according to Miss Bertha M. Green, director of the biennial event, that the 1960 show is to be no exception from the standpoint of number, importance, and variety of exhibits.

In one respect, however, this show will be markedly different from its predecessors, Miss Green said. Instead of single admission tickets, visitors will be provided with identification badges which are good for all five days (October 3-7), and admission will be by badge only.

Invitations to the show, which are designed to serve both as a registration card and badge insert (see accompanying illustration), are being distributed by exhibitors to their customers and prospects. Additional invitations may be obtained on request to Textile Hall Corp., P. O. Box 1323, Greenville, S. C., or The Editors, TEXTILE INDUSTRIES, 806 Peachtree St., N.E., Atlanta 8, Ga.

Some 300 new motel rooms have been built in Greenville and environs since the 1958 show, but the room accommodations situation is regarded as no less acute than in former years. Those who do not already have reservations should immediately write to Secretary of Rooms Committee, Box 1323, Greenville, S. C.


REGISTRATION CARD
Please use typewriter in filling in this card. Handwritten or incomplete card will delay your entrance into the Show. DO NOT mail this card. Present at Registration Booth WEST WASHINGTON STREET entrance Textile Hall and receive your badge holder.
NAME
TITLE OR DEPARTMENT
MILL
CITY
STATE
PLEASE DO NOT DETACH
NAME
TITLE
MILL
CITY
STATE
Southern Textile Exposition

Save valuable time in Greenville by obtaining beforehand from supplier friends who are exhibiting at the show one of these registration cards. Fill it in completely. Then when you arrive in Textile Hall, present the card to one of the attendants at the registration desk in the lobby and obtain your admission badge which will be issued at no cost.

Who cares for a single nail? A small item indeed, but in 10 years its cost is up 67% . . .

Are your supply costs soaring?

Remind the employees now and then not to make extravagant use of the "small" items

Staff prepared Exclusive

EFFORTS to remain competitive usually bring mills to concentrate on reducing costs through a close analysis of labor and raw materials. The one factor often hurriedly accepted at face value and with little question is supply costs.

An effective reduction in supply costs can be achieved simply by educating employees about supplies and the cost of many of the items often used extravagantly with little consideration of the effect on the profit picture.

A lesson in supply costs occasionally is worthwhile and has proved effective in more than one mill on record. If the operatives are made to be cost-conscious of supplies used everyday, a considerable saving may be realized over a period of time, although the items involved may appear of little consequence in terms of small unit cost.

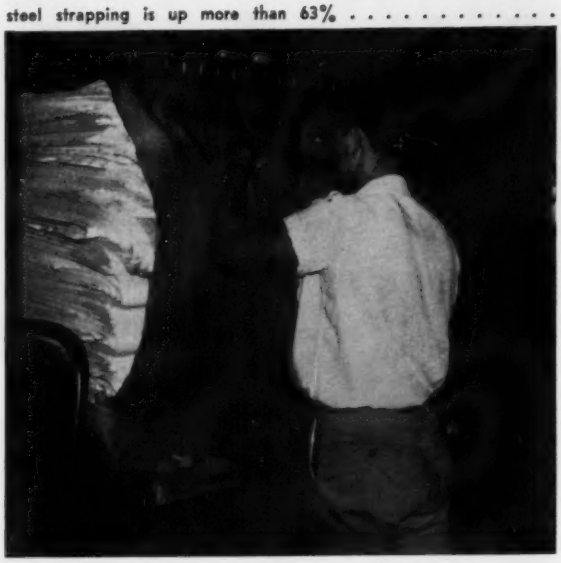
The fact that large quantities of small-cost items are used may be obscure to many operatives who may not realize the impact upon costs in the final analysis.

The accompanying illustrations may serve to emphasize the increases in supply costs over the last decade while cloth prices have remained relatively stagnant. All of the items illustrated are used in large quantities by most mills and are of noteworthy importance in figuring costs.

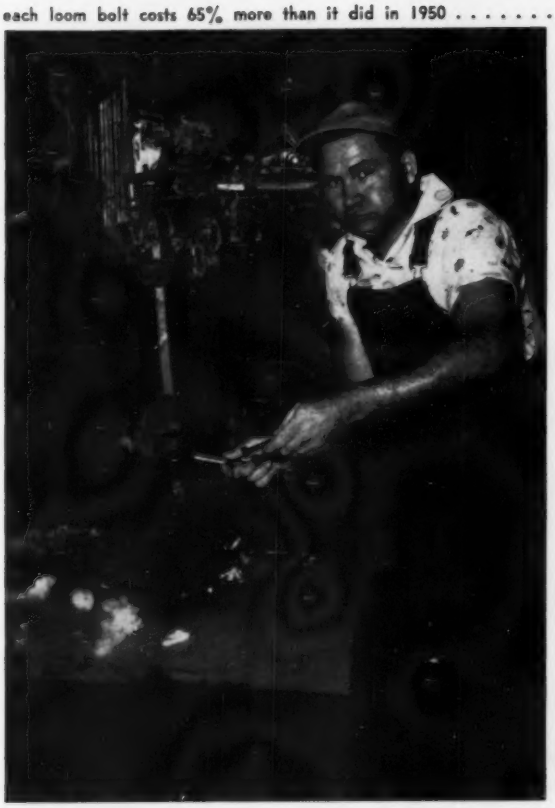
The list should not be limited to those items just mentioned; it can

while each lag bolt used costs 66% more . . . . . .

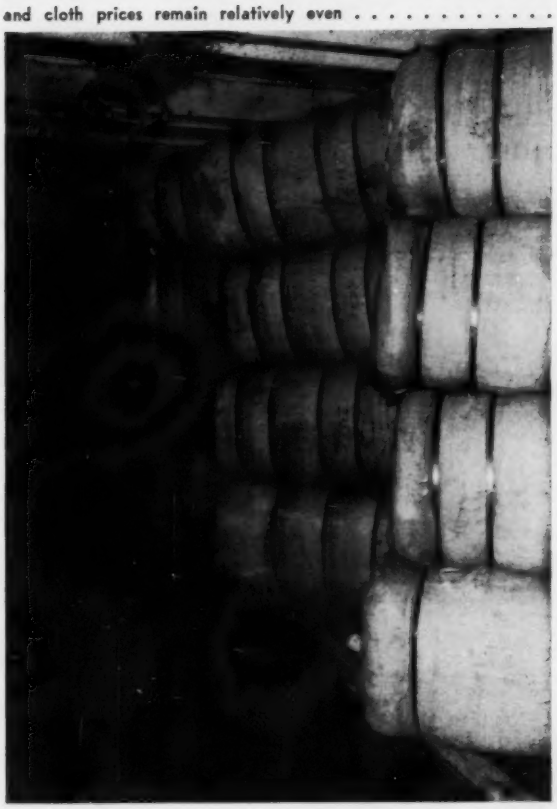
steel strapping is up more than 63% . . . . . .



each loom bolt costs 65% more than it did in 1950 . . . . . .



and cloth prices remain relatively even . . . . . .



be expanded to include anything the company buys.

There is often enough chalk lying around to last for days or weeks without purchasing another piece, and there is something about an oversupply that breeds waste. . . .

Too much bobbin enamel, which is not suited for general paint purposes, is wasted "prettying up" this and that . . . .

Too many quills are taken out of the normal channels and used as door and window props, air hose nozzles, etc., or are broken by a group of Samsons impressing each other with their power . . . .

Oversize paper forms of all kinds—"legal size" scratch pads carrying one short sentence, shop orders that are chiefly white space when completed. How many multipage orders have you seen?

Do you sell your waste paper? Burn it? What does it *weigh*? What did it *cost*?

Machines "confess" downtime

A simple instrument connected to a machine's drive shaft records the frequency and length of stops

Staff prepared—Exclusive

Superintendent W. L. Carter beside the instrument that keeps tabs on his washer production time. The charts, a portion of one is in picture below, reflect duration and time of stops, and speeds.

Drive is suited to machine and process, gives accurate results.

AT RANDOLPH MILLS, Franklinville, N. C., last summer the second shift in finishing fell 15,000 yards behind in production over a period of two months. Tachograph charts showed the wash range machine was standing too much for draining water from the washer. The situation was corrected, and the machine was back up to production level in two weeks, a direct result of recorded charts indicating the trouble.

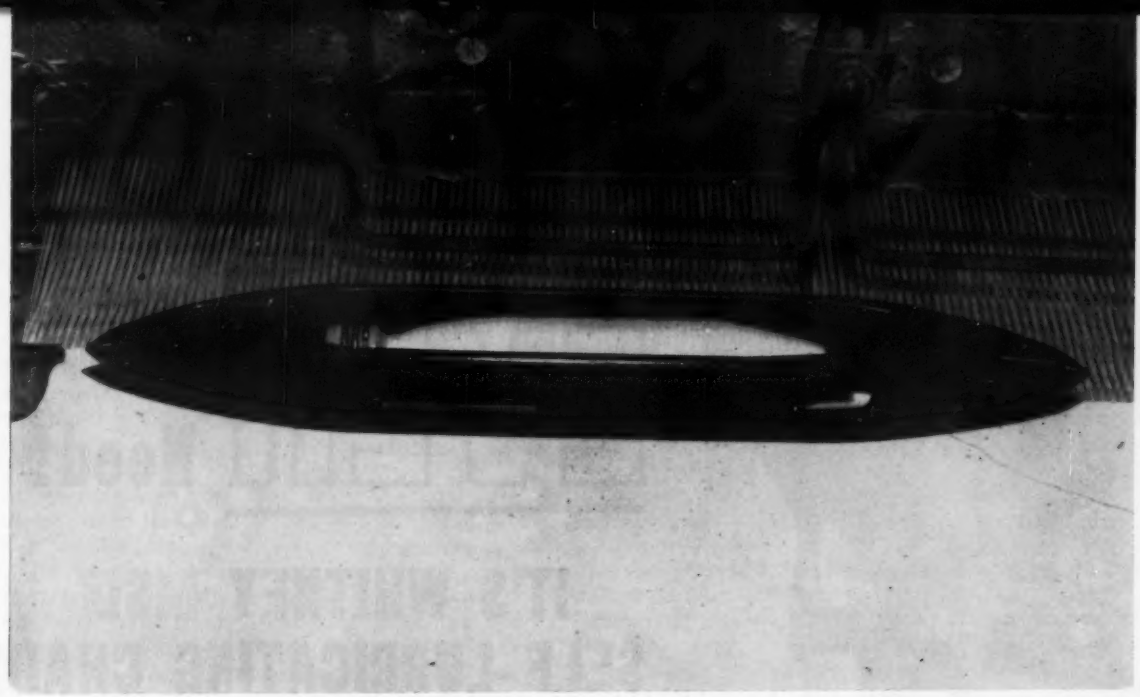
The range involved in this instance is used to wash print gum, excess color, and acid fumes out of the fabrics. Thirty-two cans are used for drying, and there are nine compartments for washing. Compartments 1, 2, and 3 hot soap the goods. There are three luke-warm rinses, and three cold rinses in plain water. The range runs 75,000 yarns in 24 hours at peak production on 36″ to 45″ flannels and broadcloths.

The Tachograph is an instrument that utilizes a clock face, and a recording dial driven by a shaft from the machine being monitored, to register running times. If the machine stops, the recording dial indicates the time it stopped and how long the machine remained idle. The chart in the clock is changed every 24 hours.

In operation for two years at this plant, the instruments are well worth while, according to management. Little maintenance is required.

Three of these instruments are in service at the Franklinville plant: one on a washer; two on tenter frames. They are calibrated to give production results agreeing with revolutions of the driving shaft; information taken from the charts by the industrial engineering department is used in production control work.

The department supervisor carries the key to the clocks, and he gives the charts an examination as he removes them. At that time he winds the mechanical clocks that drive the charts.



Plastic shuttles can take it!

Tough, unaffected by room moisture and heat, they need little attention

by G. D. McGill
Steel Heddle Mfg. Co.
Southern Shuttles Div.

Exclusive

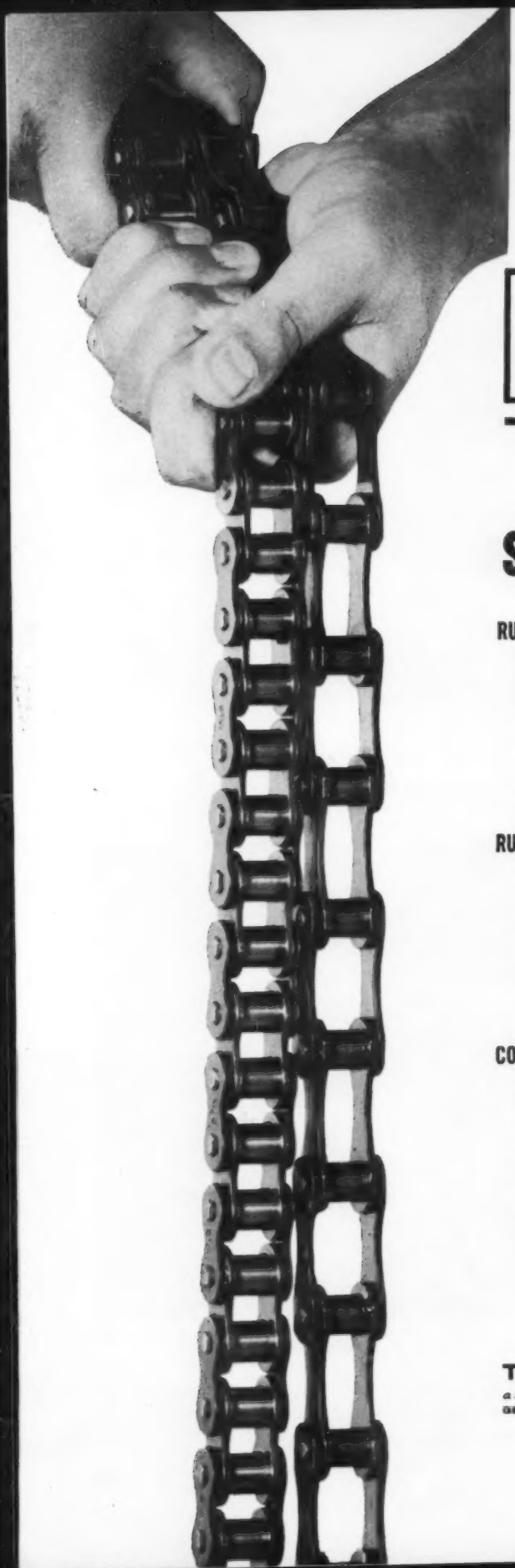
SOME FIFTEEN YEARS ago, my company embarked on plastic-shuttle development, taking its cue from the growing scarcity of dogwood blocks from which the conventional shuttle is made and from increasing loom speeds and fabric weights.

Experiments included trials on almost every imaginable plastic—all-macerated, all-fabric, paper-base, flock-filled, and all-plastic. Then, about three years ago, our research settled on the use of the present combination of multiple laminations and macerated fabric*. Where and why do these plastic shuttles go?

After the steel tip is inserted in the plastic shuttle, ends are turned to contour. High-speed routers will finish bobbin chamber, which at this stage is a rough outline.

A rather recent survey of ours disclosed that 35 per cent of the looms in South Carolina are equipped with the plastic shuttle, and if the survey is meaningful, then a very wide segment of the industry must indeed be using the plastic type. We do know that 20

*Micarta



This Chain Contains ALL the Oil it will EVER Need!

IT'S WHITNEY MSL* SELF-LUBRICATING CHAIN

RUNS CLEAN BECAUSE IT'S SELF-LUBRICATING

Whitney MSL* Power Transmission and Conveyor Chain is lubricated for life by oil-impregnated sintered steel bushings. In operation, the lubricant expands and flows over all vital bearing surfaces; when the drive stops, the lubricant contracts and is reabsorbed by the bushing. This cycle continues throughout the chain's service life. *No additional oil is required.* This means clean running chain—no contamination of product or materials in food, textile, paper, chemical and packaging industries!

RUNS LONGER BECAUSE IT'S SELF-LUBRICATING

MSL* Chain outlasts conventional pre-lubricated chain as much as 5 to 1 in severe operating requirements. Built-in lubrication at the 3 critical wear points—Pin, Plates, and Sprocket Engagement—solves a major chain problem: more damage is caused by faulty lubrication than by years of normal service. Highest material standards, advanced manufacturing processes and self-lubrication are combined in MSL* Chain to give you longer service life.

COSTS LESS TO USE BECAUSE IT'S SELF-LUBRICATING

By eliminating the need for manual lubrication or lubricating devices, Whitney MSL* Self-Lubricating Chain ensures *lower installation, maintenance, and use cost.* Whitney MSL* Chain conforms to A.S.A. Standards and is completely interchangeable with any similar pitch chain.

Get complete details on this outstanding chain today. Ask your nearby Whitney Chain Distributor, or write for Bulletin MSL B-2.

***Maximum Service Life**

THE WHITNEY CHAIN COMPANY
a subsidiary of FOOTE BROS. GEAR AND MACHINE CORPORATION
4591 S. Western Blvd., Chicago 9, Ill.

POWER TRANSMISSION DRIVES

per cent of our production is already devoted to them, the remainder being devoted to the conventional unit.

While cotton weaving consumes most of the new type, there is a considerable quantity being used in spun synthetic weaving. And, with the recent introduction of shuttles of the needed size, a "corner" in the woolen and worsted weaving industry has taken to the plastics with vigor.

The growing popularity of the plastic unit springs from its having an average life more than three times that of its dogwood counterpart, all else being equal.

The laminated plastic cannot absorb water unevenly as does the dogwood unit through its end grain, its toughness eliminates most failures through fracture, and no normal combination of temperature and humidity affects its operation.

As it wears to a naturally smooth surface, it requires little or no sanding; its natural density permits spurs, springs, and eyes to be fitted to it with greater precision than wood allows—eye-rocking and loose-gripping are much reduced; and a shuttle originally made for an 8" quill may be altered to receive an 8¾" quill without introducing a likelihood of shuttle splitting.

(In ending his article, Mr. McGill stated that most complaints concerning shuttle weight have been overcome by "proper loom adjustment," after which the shuttles "are boxed in with relatively the same force that occurs with conventional wooden shuttles."

Judging from several discussions during meetings of the Alabama and Georgia textile operating executives, the "proper loom adjustment" is a reduction in power.

The change, or adjustment, makes sense in theory as well as in fact, for as every weaver knows, even the relatively light-weight dogwood shuttle can be swatted hard enough to "drive it through the box." That a heavier shuttle will bounce under the same power given a dogwood shuttle, or erode box leather and check straps set tight enough to hold the added momentum, is a foregone conclusion.

The picking motion, with a "powerful" lot of power to spare, is not extended in the least with the minor increase in weight that "burns up the catcher." — The Editors)

Merchandising notes *(from page 81)*

advertising agencies to give clients comprehensive aid in over-all selling programs.

Pellon Corp. has introduced "Pelomite," a light-weight nonwoven stabilizing fabric with tiny fusing granules on one side which melt with the heat of an iron to form a bond with woven or knitted outer fabrics without affecting porosity. It is used for small detail areas—buttonholes, pocket flaps, plackets, and the like—where perfect fit and finishing are required.

J. P. Stevens & Co., Inc., is now using a new corporate trademark:

The design is adapted from the Federal mirror which was popular when the firm was founded.

Underwear Institute has, temporarily at least, shelved its plans for a national promotional campaign, because of lack of support from its members. A minimum of $100,000 a year was needed for the program, but only 38 mills agreed to support the promotion,. at a level of $68,000 a year for two years.

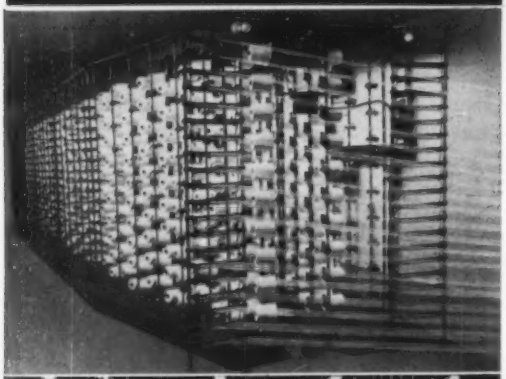
Vat Dye Institute has completed a survey on the potential market for colored sheets and pillow cases. Pertinent findings: Only about 36 per cent of America's housewives have ever bought colored sheets; white accounts for 81 per cent of the total sheet inventory in U. S. homes; housewives using colored sheets have an average of 18 per cent more sheets than those using white. Perhaps a major reason for lack of greater acceptance of colored sheets: Housewives see white as being cleaner, more sterile, and purer than any color. Where colored sheets are used, pink, blue, yellow, green, and lavender are the favorites, in that order.

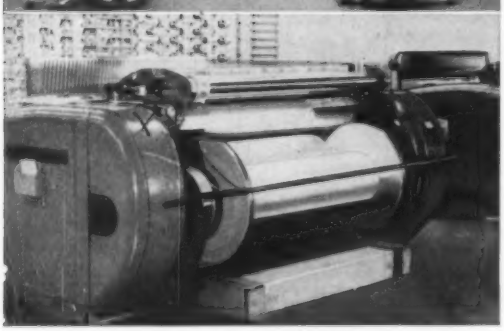
Zella of Beverly Hills is the first American firm to show all-wool skirts and dresses permanently pleated by the Australian Si-Ro-Set process, and the first with women's permanently creased all-wool slacks. The skirt and dress fabrics were knitted by Broadway Knitting Mill, and the pleating was done by California Pleating Co.

Munsingwear, Inc., is using a merchandising gimmick for retail store personnel—a hard candy mint wrapped in cellophane with the gold and maroon Munsingwear colors, and bearing the slogan, "Make a Mint With Munsingwear."

Burlington Industries have commissioned a 25-minute color film, "The Patterns of Progress," showing the importance of the textile industry in American life. Prints are now available on a free loan basis to schools and colleges, business and financial groups, civic clubs, plant groups, and other interested organizations. For details, contact Modern Talking Picture Service, Inc., 3 E. 54th St. New York 22, N. Y.

Cabin Crafts, Inc., has introduced a new Acrilan carpeting, "Country Spice," in which four separately colored staple fibers are spun together in an imperfect but controlled blending process to achieve a multicolored yarn. In the tufted carpet, the yarn gives an irridescent effect. Contrary to the effect obtained in tweed-type carpets, "Country Spice" contains only the single varicolored yarn.





THE UNBEATABLE COMBINATION

...used by more yarn producers than any other

Leading mills everywhere rely on this equipment because of its speed, high quality production, versatility, convenience, and economy.

Cocker Tricot Warper Model MB 55-32 (Top Photo)
Handles 2-21", 1-42", 1-55" Beams, or 1-50" or 2-25" Raschel beam with simple changeover from one set to another. Individual controls, in full view and easy reach of operator. Has all modern features and safety devices. Normal sustained speeds up to 600 YPM.

Cocker Horizontal Type Magazine Cone Creels (Second Photo)
Standard creel is built to take four pound packages but can be built to take larger packages. Takes any type package. Cone holders are arranged to swing around inside the "V" for re-creeling without interfering with the operation of the machine. Equipped with electronic eyeboard stop motion. A wide range of tensions is available.

Cocker Vertical Type Magazine Cone Creel (Third Photo)
Available in true vertical or magazine . . . equipped for any type package. Tensions are new improved type with adjustable posts for varying tensions in the yarn. Tensions can be run on light yarns without washers, or washers can be used on one or both posts when yarn requires it. Electronic stop motion available.

Cocker High Speed Spindle Driven Warper (SD-49) (Bottom Photo)
Will handle any type yarn. Produces unexcelled synthetic warps from finest deniers to heaviest tire cord yarns. Takes section beams with flanges up to 40" dia. Produces warps of any desired density at speeds up to 1000 YPM.

Visit Cocker's Display
Booths 836 and 837
Southern Textile Exposition

Write for full information today.

COCKER MACHINE & FOUNDRY COMPANY

IN CANADA: Contact W. S. Clark, Montreal, Canada, Oxford 7-2242

IN MEXICO: Ing. J. Via, Jr., I. La Catolica 45-911, Mexico, D. F.

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WORLD'S LARGEST DESIGNERS AND BUILDERS OF COMPLETE WARP PREPARATORY EQUIPMENT

Maintenance records simplified

Now they are a more effective instrument of Tallassee Mills' maintenance program

by J. H. Boddie
Superintendent of Maintenance
Tallassee (Ala.) Mills Division
Mount Vernon Mills, Inc.

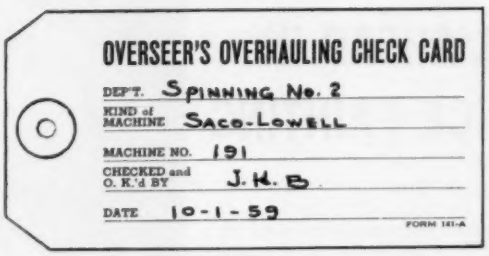
Extract*

A SYSTEM of recording maintenance data, developed at and used in Tallassee Mills Division of Mount Vernon Mills, Inc., has merit from the following standpoints:

1. Simplicity.
2. Economy of time to keep records and space to keep them.
3. Records number and cost of replacement parts.
4. Assists in the evaluation of old model machines as against later designed machines from a maintenance standpoint.
5. Assists in the evaluation of machine overhaul frequencies.
6. Assists in solving lubrication problems.
7. Points out improper machine operations.

A rather comprehensive cost-card system was in use before the development of the present system. The need to reduce the clerical cost of keeping records was the initial motive for revision. It was found, however, that the new system presented other features of value which shall be explained later.

Tallassee's Maintenance Record System. The system may be briefly



FRONT

Fig. 1 (above). Card used by overhauler foreman to identify the machine, location, and date overhauled.

BACK

Fig. 2 (right). Parts used and special work done is listed on reverse side of card (Fig. 1).

Fig. 3 (below). Data from card (Fig. 2) is condensed and entered on this master sheet. These sheets are filed in indexed loose-leaf folder.

SPINNING OVERHAUL RECORD

PARTS USED - 19 59

ITEM NO.	NAME OF PART	May	June	July		TOTAL USED	STD.	UNIT COST	TOTAL COST	STD. COST
1	Crown Gear Bush.	12	16	12		40	48	.26	10.40	12.48
2	Aprons (Sets)	3	2	4		9	14	61.56	554.04	861.84
3	Eccentric Gear (39T	-	1	-		1	1	4.52	4.52	4.52
4	Cross Shaft	2	3	1		3	2	9.47	28.41	18.94
5	Vertical Shaft	-	2	3		5	6	10.00	50.00	60.00
6	Upright Arm	1	-	1		2	1	3.14	6.28	3.14
7	F. E. Brg. Housing	1	-	-		1	3	18.26	18.26	54.78
8	Comp. Gear	2	1	-		3	*	7.10	21.30	-
9	Cam Shaft	4	1	2		7	5	6.75	47.25	33.75
10	Gear Cover Z-157	-	2	1		3	*	2.04	6.12	-
11	Clips Z-315	-	4	-		4	*	.10	.40	-
12	Pedal Z-289	-	-	2		2	1	3.71	7.42	3.71
13	Worm Z-101	1	2	-		3	2	8.94	26.82	17.88
14	Yoke Z-156	1	-	-		1	1	2.48	2.48	2.48
15	Pick Wheel Z-96	-	-	2		2	6	5.04	10.08	60.48
16	Thrust Brg. Z-332	-	2	3		5	6	3.23	16.15	18.78
17	Joints-Steel Roll	2	1	2		5	4	7.05	35.25	28.20
18	Steel Roll Necks	2	1	2		5	4	1.10	5.50	4.40
19	Pittman Roll-Z-95	5	7	2		14	12	4.85	67.90	58.20
20										
21										
22										
23										
24										
25										
26										
					TOTALS				918.58	1243.58

MISCELLANEOUS:

1. Rings Turned
2. Pneumafil System Cleaned
3. Frame Cleaned, Leveled
4. Spindles Plumbed

* No Standard Set

*From paper presented at the Textile Engineering Conference, Raleigh, N. C., March 31-April 1, 1960, of the American Society of Mechanical Engineers.

HOW DU PONT PUTS YOU DOLLARS AHEAD IN MAINTENANCE PAINTING

Ben Warwick is a paint expert who specializes in the solution of maintenance problems for the textile industry. As a member of Du Pont's Technical Service Group, he has but one function: to help you cut the cost of maintaining your substantial investment in plant and equipment.

"To insure maximum returns for every dollar spent on paints and painting," he reports, "the only true measure of value is cost-per-square-foot-per-year. Take it from me, an additional paint dollar spent initially can save ten later on. When you specify Du Pont finishes, however, you're getting *more* than top-quality paints. You're getting sound paint practice, backed up by proven field performance.

"A case in point is our new Textile Floor Finish, a single package oil-free urethane clear for all interior wood and concrete floors. With this new finish, you can apply the first coat on an off-day morning, the second that afternoon and let full traffic back on it at midnight! In actual on-the-job tests, this tough coating has delivered up to *3 times* the durability of ordinary first-grade floor seals.

"Naturally, our recommendations don't stop with selection of the proper finish. To effect the kind of savings that translate maintenance dollars into *profit* dollars, the right paint system is just as important. We work closely with your maintenance men, drawing on our own experience to provide expert guidance all along the line. The result: paint maintenance tailored to your particular needs, *at lowest cost per square foot per year.*"

For more information on Du Pont's full line of quality finishes for every maintenance need, contact the Du Pont district sales office in *your* area. Or write: E. I. du Pont de Nemours & Co. (Inc.), Finishes Division, Dept. TI-68, Wilmington 98, Del.

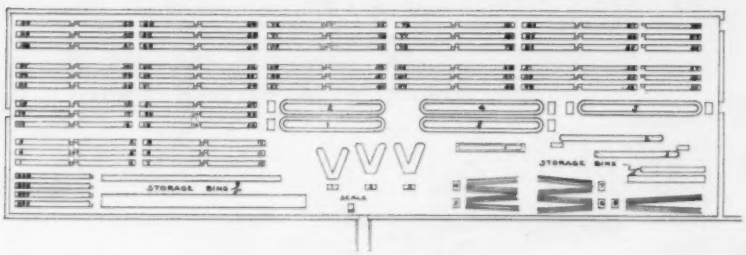
* * *

Benjiman G. Warwick has been with Du Pont's Finishes Division more than a quarter century. For the past 16 years he's been busy helping textile mills in southern Virginia and the Carolinas solve their maintenance painting problems. Last year, he personally supervised the initial application of Du Pont's new Textile Floor Finish in 30 plants in that area. Ben is an active member of the Southern Textile Association.

DU PONT PAINTS

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

Fig. 4. Machinery plan is reproduced on reverse side of master sheet (Fig. 3). Groups of machines overhauled during a given month may be identified by shading with colored pencil.



described as follows:

1. A card (Fig. 1) is used to record the machine number, location, and date of overhaul of each machine.

2. The parts used are written on the reverse side of the card (Fig. 2). This information is recorded by the overhauling crew foremen.

3. At the end of the month all cards are turned in to the department office.

4. The data recorded on the cards are condensed and entered on one master sheet (Fig. 3).

5. A plan of the department machine layout (Fig. 4) is on the reverse side of the master sheet. The group of machines overhauled during a given month may be shown by shading with pencils of contrasting colors.

It may be noted that the master sheet provides space to show the composite number and cost of each part used on the entire group of machines overhauled.

By the use of this method, the entire group of machines is viewed as a whole, instead of as a large group of machines taken individually.

Results of First Record Analysis. The analysis of the first records, taken after the system was changed, revealed several poor conditions. Action taken to correct these conditions resulted in improving the effectiveness of the maintenance program.

As a case in point, the master sheet revealed what was judged to be an excessive number of one part used. Upon investigating the probable cause of this, it was found that the parts in question were not being lubricated properly.

In another instance, improper operation of the machines while in production resulted in an excessive number of parts being broken.

When the accumulated data taken from several cycles of overhauling were analyzed, cost-of-overhauling standards were established. These standards are subject to revision periodically as the costs of parts and labor change or as improvements result in reducing the number of parts used.

The data recorded on the master sheets also may be used to determine, with reasonable accuracy, the minimum number of parts that will be needed for subsequent overhauling. The resulting savings realized by keeping spare-parts stock at a minimum can be quite impressive. Especially is this true in a large plant where hundreds of machines are in operation.

Many other uses may be made of the data from this record system such as:

1. The evaluation of the quality of so called improved machine parts.

2. Determining the practical limits of machine speeds.

It should be pointed out that this form of keeping records is primarily an instrument of the maintenance department and not to be used for cost-accounting purposes, even though it may be used as such with reasonable accuracy.

It should be noted further that the value of this system depends upon mill conditions which are necessary to the accuracy of the analysis of data accumulated.

Requisite Plant Conditions. The requisite conditions existing in Tallassee Mills where this system is used are as follows:

1. Large numbers of identical kind and model machines are in production and machine parts are interchangeable.

2. Machines are overhauled on schedule.

3. Labor cost is constant.

4. Infrequent repairs are necessary between overhauling cycles.

5. All machine parts are requisitioned by the maintenance department.

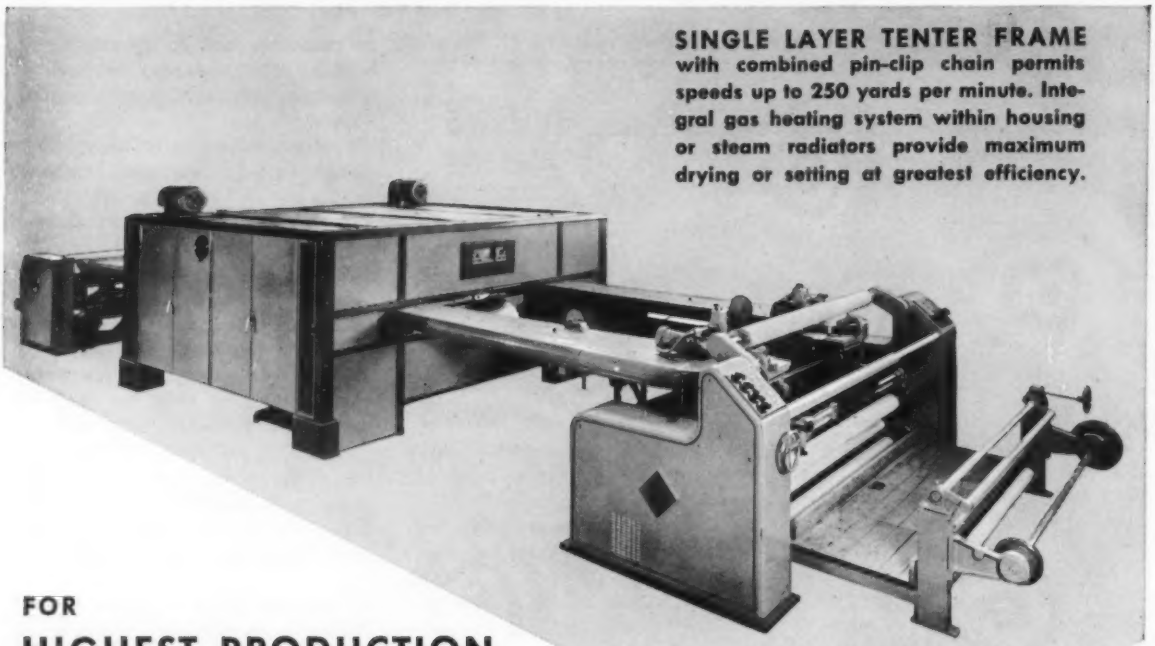
15 hazards for plant guards to watch for

■ A LIST of the 15 principal plant safety hazards has been published by Pinkerton's National Detective Agency as a guide to the sort of thing that plant guards should be on the lookout for:

1. Slippery floors.
2. Tripping hazards, such as hose lines, piping.
3. Inadequate warning signs at excavations, manholes.
4. Missing (or inoperative) entrance and exit lights.
5. Poorly lighted stairs.
6. Loose handrails or guard rails.
7. Aisle or street obstructions blocking access of fire equipment.
8. Overheated motors.
9. Loose or broken wiring.
10. Open fire doors.
11. Running motors not in use.
12. Defective ladders or scaffolds.
13. Leaks or unusual fumes.
14. Broken windows or doors.
15. Dangerously piled supplies.

And to speed the guard on his appointed rounds as safely and effectively as possible, Pinkerton's advises its guards to observe the following:

1. Don't attempt to make rounds after dark without a good flashlight.
2. Look for obstructions and low-lying ground hazards, such as wires, piping, and supports.
3. Take your time; don't take short cuts.
4. Go around obstructions and not over them.
5. Be careful of loose boards and unstable platforms.
6. Avoid slippery surfaces.
7. Look where you walk.
8. Don't run downstairs, and always use the handrail.
9. Be careful climbing ladders; check ladders before using them.



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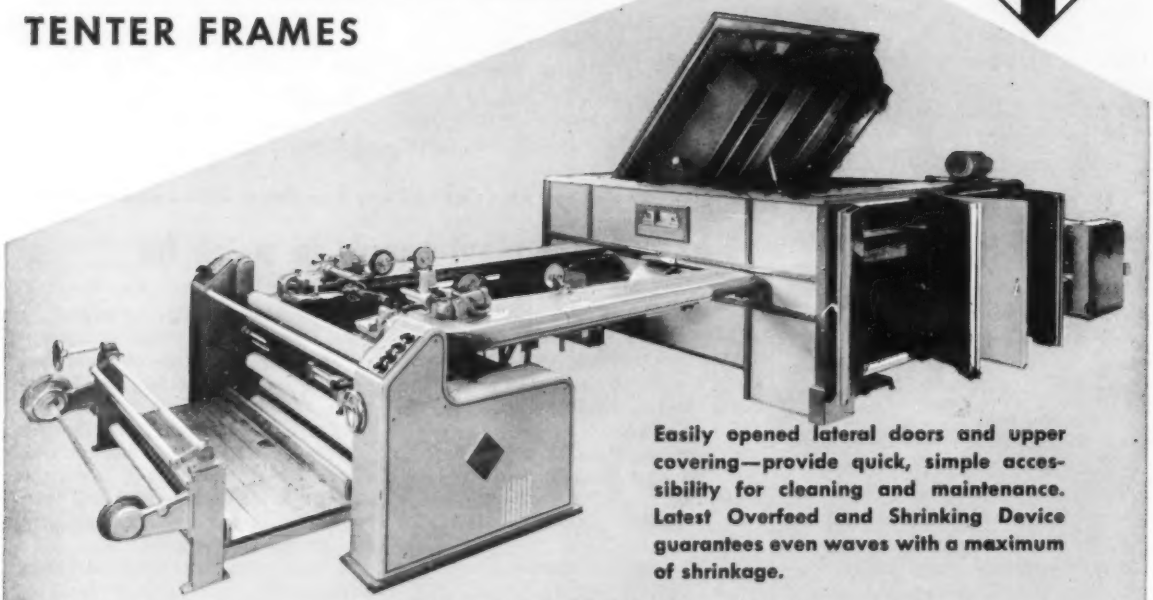

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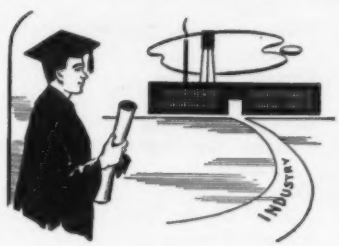

Welcome to America's textile manufacturing and associated industries....

1960 TEXTILE SCHOOL GRADS

■ THESE are the graduates of the 1960 classes of 6 U. S. textile schools.

Names of firms by which they have been employed appear immediately after the graduates' names if this was known at the time the information was compiled for TEXTILE INDUSTRIES by the schools.

The word "Military" after a person's name indicates that he elected to begin active service with one of the armed forces immediately after graduation.

Congratulations and best wishes to all of you!

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Leland E. Glass, E. I. du Pont de Nemours & Co., Inc.
Oscar Scarbrough, J. P. Stevens & Co., Inc.

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John Clarence Adams, Tenn. Eastman Co.
Nathaniel Virlyn Bradford, Graniteville Co.
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Frank Cheatham, Courtauld's Alabama, Inc.
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Thomas M. Griffin, Riegel Textile Corp.
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Carl Anderson Hill, Excelsior Mills
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James Wallace Keeble, Callaway Mills Co.
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1960 TEXTILE SCHOOL GRADS

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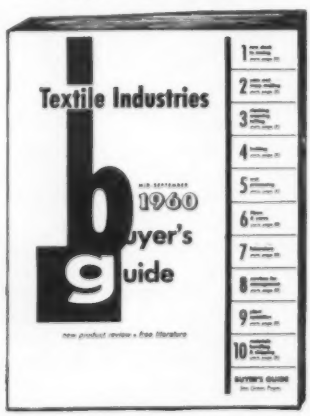
Coming Next Month . . . .



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KNITTING SECTION

Yes! There IS a

remedy for cut holes, dropped stitches

on circular hose machines

by Frank Paul
Exclusive

THE NUMBER of "cut holes" and "dropped stitches" in socks made on the SCP and SCOP (and other similar circular knitters) may be greatly reduced by reworking the surface areas of the latch openers, located on the carrier ring.

These defects, the result of malfunctions, cause the sock manufacturer great concern because socks containing either or both defects will definitely bring very little—usually no profitable return at all. In fact, one may consider himself very lucky if he manages to get his yarn costs back for such socks. Yet, a visit into plants which produce circular knit goods will reveal that there is a definite continuation of cut holes and dropped stitches in the goods being knitted. It would seem that there is no remedy for this malfunction.

Divided Opinion Exists. There is, however, a remedy for much of it, even though a contrary opinion exists among most machine fixers. This opinion exists because "cut holes" and "dropped stitches" are often very difficult to detect and correct in the operation of the knitting machine.

This is chiefly because usually the machine will not develop trouble of this nature unless it is running at normal operating speeds. A fixer may turn a machine manually for hours trying to detect the cause of a single cut hole or dropped stitch, but rarely will this procedure prove successful, because there is not ample torque, static, centrifugal force, or sympathetic vibration which occur at normal operating speeds.

Latch Openers May be at Fault. Latch openers on circular knitters may actually cause more cut holes and dropped stitches than they eliminate. This is especially true if they are not shaped or smoothed correctly or if they are too low in relation to the track of the needle latch in its travel throughout a course of knitting.

This relationship was not of paramount concern with the first patterns produced on solid color machines. These patterns, usually being patterns with even progressions, did not present the multitude of problems that occur with present day patterns, especially those which overknit continuously upon a common needle.

Recently we have observed that latch openers, of the stationary insert cam type, can be positioned too low in the latch-track relation, thereby not allowing a sufficient interim to permit an outward and downward movement of the latch while the needle makes its travel over the stitch cams. This is illustrated in *Fig. 3*.

Note that the needle latch is trapped against the latch opener. Therefore, any fabric or yarn between the latch proper and needle shank during the continued rise of the needle will surely strain that yarn to the breaking point. A situation such as this occurs within a carrier ring as illustrated in *Fig. 1* (latch openers are dark areas) with latch openers shaped as in *Fig. 3*.

Manual operation will rarely, if ever, present a situation such as this. However normal operational speeds give instant rise to the problem.

Observe also in *Fig. 3* that latches will open on needles No. 7 & 8 only during the upward movement of needles, due to the short distance between the latch opener and the low extremity of the needle track.

The Correction. To remedy this situation it becomes necessary to

now peak production of the finest seamless nylon stockings

announcing the new "Reading-Booton" twin-feed machine

* **2-feed automatic, highly efficient end trimmer. Trims all ends to a length of from ¼ to ⅜ inch.**
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The new "Reading-Booton" Twin-Feed Machine opens new profit possibilities in the knitting of ladies' seamless stockings. It gives you twin-feed production, plus amazing simplicity of operation, and trouble-free performance.

New features developed by Textile Machine Works for the proven Booton Machine. This new precision machine belongs in your production planning. Backed by our world-wide service organization. You'll want to see the new "Reading-Booton" in operation before you buy any seamless machine. Call us today.

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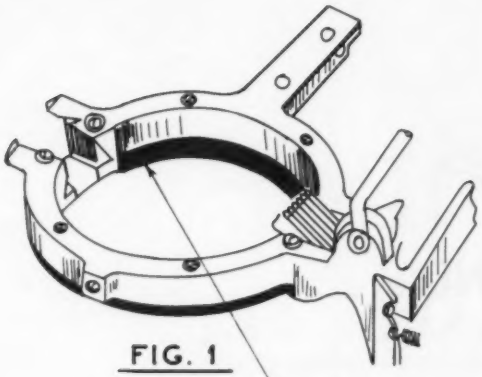

FIG. 1

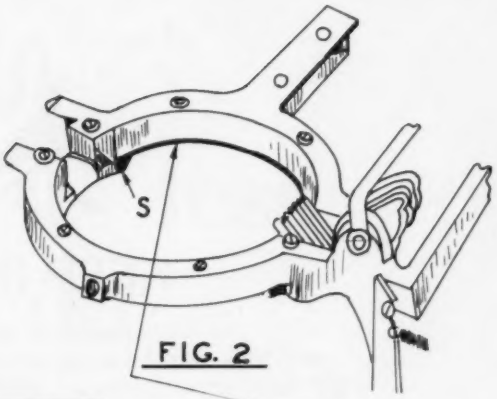

FIG. 2

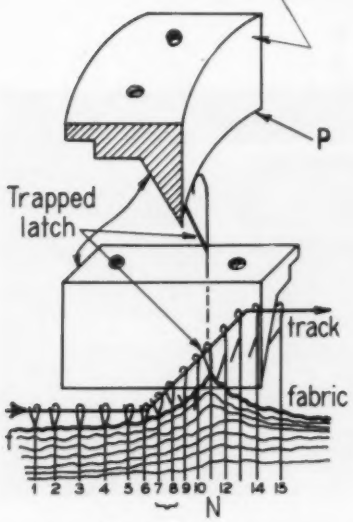

FIG. 3

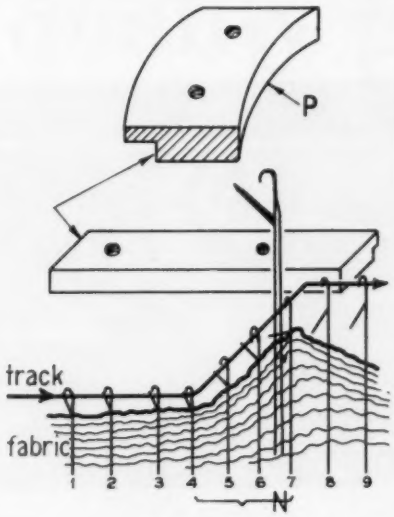

FIG. 4

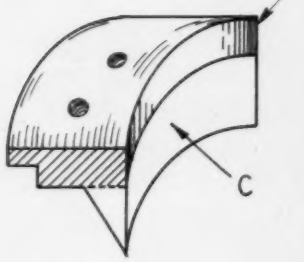

FIG. 5

increase the distance between the latch opener's lowest extremity and the low extremity of the needle track to allow an interim long enough for the latches to rotate outward and beyond at point P, *Fig. 3 & 4,* on the latch openers. Regardless of the shape of these openers, a latch will not open if the point of the latch is not out past this point P or the inward portion of the latch openers.

Fig. 4, which is a portion of a carrier ring such as is illustrated in *Fig. 2,* will prove this to be a much better method. Note that in the course of needle rise the interim has been increased to allow latches on needles 4, 5, 6, and 7 to open past point P and therefore eliminate the situation of trapped latches as illustrated in *Fig. 3.*

To accomplish this feat, and thereby eliminate a vast number of cut holes and dropped stitches, follow these simple instructions: Remove the cam type latch openers from the carrier ring one at a time, leaving all others intact. Cut or grind away slowly that portion of the latch opener illustrated by C in *Fig. 5* (do not allow the metal to become overheated). Retain just enough of the edge next to the mouthpiece S, *Fig. 2,* to assure a smooth juncture of these two parts. Polish all ground edges to a smooth finish.

Return the finished part to the carrier ring (leaving the others intact will be an aid in the alignment of this part). Follow the same procedure for all other cam latch openers, and when securing with the screws provided with the original type openers, do not allow any of these screws to protrude through the bottom side of the refaced opener.

The advantages of this method are more than the expected reduction of dropped stitches and cut holes. There is of course a reduction in needle breakage, sinker breakage, and feed finger troubles. Fixers will gain time for application to troubles elsewhere. There is greater visibility about the knitting head, and other advantages.

It will be recognized, more and more, that this method is a definite help in overcoming the day-by-day, hour-by-hour problems of "cut holes" and "dropped stitches" that have plagued fixers and manufacturers a long time. Surely, a step taken to alter these parts will in short time help produce greater quantities of quality socks in less time by making the best use of and getting the ultimate out of manpower, material, and machines. The time and money necessary to make this change will not be wasted.

KEEP IN MIND...

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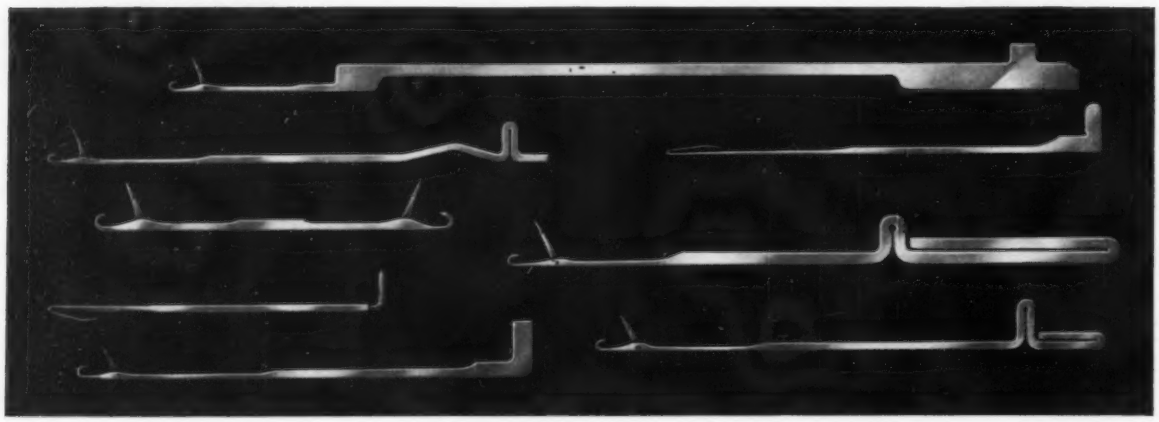
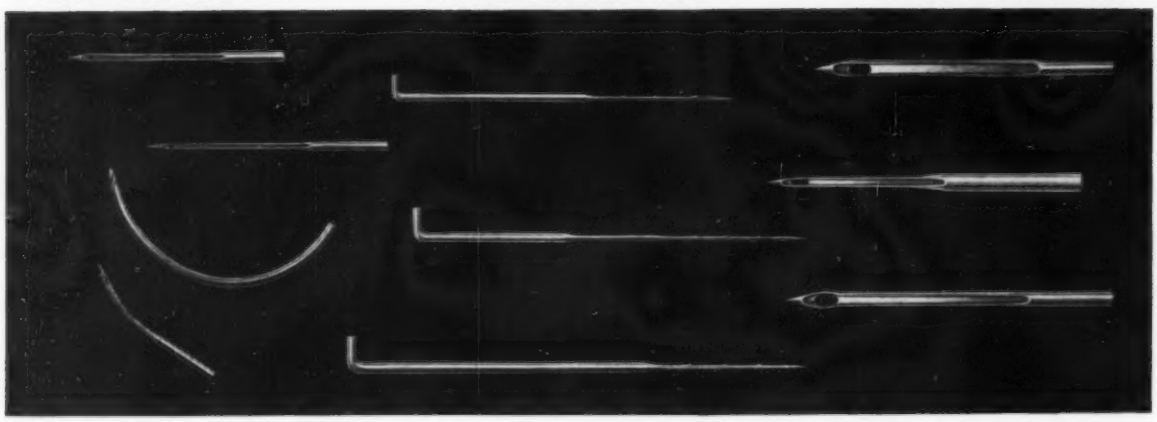


FOR SEWING FOR FELTING FOR TUFTING



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Believe it or not!

It costs less to make quality goods

Take another look at the "sure-fire" cost cutting techniques used in your plant. They have been known to "back-fire" by increasing production costs

by Winston Shewmake—Exclusive

QUALITY men's fancy socks can be made cheaper than socks of poor quality. This seems to contradict ordinary and accepted reasoning among many hosiery manufacturers, but it is true.

To manufacture any product with a reduction in manufacturing cost is one of the prime aims of all manufacturers, regardless of what the product is. Hosiery is no exception, and many methods and plans have been tried to lower the cost of manufacture, some with nearly disastrous results. Here are some of these sure-fire cost cutting practices that have been known to back-fire.

A lot has been said about industrial progress, and special attention has been given within the last several years to a system of maximum production incentive, and/or increase of work load. Now it would seem (disregarding the law of diminishing returns) that the increase of work load would ultimately decrease total manufacturing costs.

This system usually operates something like this: The knitter works an eight-hour shift and is paid a flat $1.20 per hour, or $9.60 per day. For the last six months the knitter has averaged 40 dozens of socks per day.

The knitter is satisfied but the manufacturer is not, so a meeting of department heads is held with the object of the meeting being to secure more production at lower cost and still maintain quality. It is known that the knitter (for the $9.60 he is paid) produces 40 dozens of socks at a rate of 24 cents per dozen. So, it is decided that the knitter's work load will be increased to enable him to produce 46 dozens per day, and if he averages 46 per day for five work days he will be handsomely rewarded with a bonus of $4.50. If payday comes once in two weeks this is a $9.00 increase in pay.

When the knitter is informed of the increase in work load and of the possible $9.00 per pay-check increase in pay, he is of course elated with the idea of more money. And he is reasonably sure that he can do the extra work, at least for a while. So management adopts the "bonus plan" that is to produce more goods at lower cost. Quality, of course, will still have to be maintained.

"Socks by the Number." But just the opposite may happen, and if the management of small mills will examine the plan and resulting situations carefully, they will notice the knitter or operator under such a plan suddenly becomes "number" conscious. He is paid by numbers, and the larger the number that he can record each day the more his take home pay will be. His mind and eye are constantly on the number of dozens he can produce and *not* on the quality of work being produced.

He will, on numerous occasions, inform his fixer that a certain machine is not functioning correctly, but he will not stop that particular machine if it will continue to produce.

Probably the machine is knitting only slightly inferior goods, but that does not worry the knitter. He is still making dozens and still making money off that machine. He is a "bonus operator," one whose

pride of accomplishment in a job well done has deserted him.

Therefore (and it has been proved), the bonus plan may backfire.

It is disastrous for a plant to lose its reputation and customers. All that can be said of the "bonus production plan" is that it might sometimes produce more goods, but not better-quality goods. And if the inferior goods produced cost the firm its customers and reputation, certainly the cost of production is extremely high.

Buy Cheap Parts and Materials. Another "sure-fire" practice that is supposed to reduce the cost of manufacture and one that often back-fires is the "secure cheaper components" idea. Currently, one of the most perplexing problems facing the hosiery manufacturer is the question: "From whom should I buy manufacturing components?"

Our modern day advertising often leads one to think that every product is superior to all other similar products. Also, the variety of yarns and other necessary components have increased so that a hosiery manufacturer is obliged to keep a number of his machines on samples to test or try each new development that hits the market. This can be anything from colors and blends of colors, to new and different kinds of man-made fibers, and all kinds of combinations of each.

Another destroyer of quality that has recently been introduced to the hosiery trade is faster methods of manufacture with *almost* as good quality, which is within the same category as cheaper components.

It is impractical, if not impossible, for any mill to buy inferior basic components of yarn, processing, manufacturing methods or machinery, or personnel, and expect to maintain a high standard of quality.

Recently a mill tried to reduce costs by purchasing a cheaper grade of yarn. This reduction was about eight per cent under the price of a similar yarn that had given stable and quality production for a long time. The change was made in an effort to produce the same quality of sock that had been produced, but at reduced cost in manufacture.

The resulting sock looked just as good and even had a better feel than the ones produced with more expensive and better yarn, but there was so much breakage at the machines that production fell, waste increased, substandard work went up, needles and parts breakage increased, and the morale of both fixers and knitters took a nose dive. In fact, the yarn ran so badly that one fixer simply walked off the job.

Reducing initial component costs is not necessarily a sure-fire way to reduce production costs. This plan, as shown by experience, can increase costs and destroy sales as well as profits.

Be "Almost as Good." These are only a few of the more prominent ways that inferior goods are being produced at higher costs than would be required to produce a product of higher quality. There are other "quality killers" such as excessive machine speeds, incompetent operatives who will work at a lower rate of pay, and installation of new machinery that will do *almost* as good as standard equipment and do it faster.

In fact it is this "almost as good" idea that is hurting the hosiery industry today. It seems that almost every manufacturer has got into such a binding situation that it's not feasible to try to produce a product of perfection.

Everyone is trying to cut costs, and quality is *almost* as good as it once was. But yarn counts have gone down, courses have been eliminated, stitches loosened up, smoothness inside has been sacrificed for patterning variety, and a host of other "cheapening" methods have been used.

Take This Road. Under these plans and systems of operation it is inevitable that in the end it costs more to produce faulty merchandise. In fact in some cases it has meant complete failure of business. So, to assist management to proceed with care, here are some worthwhile suggestions:

(1) Be extremely careful in planning a *bonus production plan*

(2) Run your own tests for cutting *costs of components*

(3) When tempted to increase rpm, remember that "speed can kill" profits, too

(4) Expect no more operative or fixer skill than you pay for

(5) Beware of buying machinery that will perform faster and *almost* as good, for this is just another way of producing inferior quality quicker

(6) Don't destroy pride in product perfection by adopting "cheapening" practices

How to make rack stitch fabrics without special attachments

■ BECAUSE of the growing interest in rack stitch fabrics, the Wildman Jacquard Co. devised a method of knitting a variety of rack stitch effects on the Model TA, TAI, and TJI circular knitting machines without the necessity of using special attachments of any kind. These rack stitch effects can be varied from narrow panels to entire bodies if desired, it was explained.

Combinations of rib, half cardigan, full cardigan or tuck stitches can be knit with rack effects, the announcement stated, using coarse or fine gauge machines, all with knit-on cuff and fully automatic operation.

How It Is Done. The method used to produce the rack stitch effects requires only the rearrangement of the needle setup plus the proper selection of knitting feeds in conjunction with the operation of the standard rack cam. The rack cam movement relative to the feeds that are actually knitting determines the panel areas (width) wherein the rack can take effect.

When operating the machine using any standard knitting set-up, it will be noticed that there is a definite space between one feed and its pro-

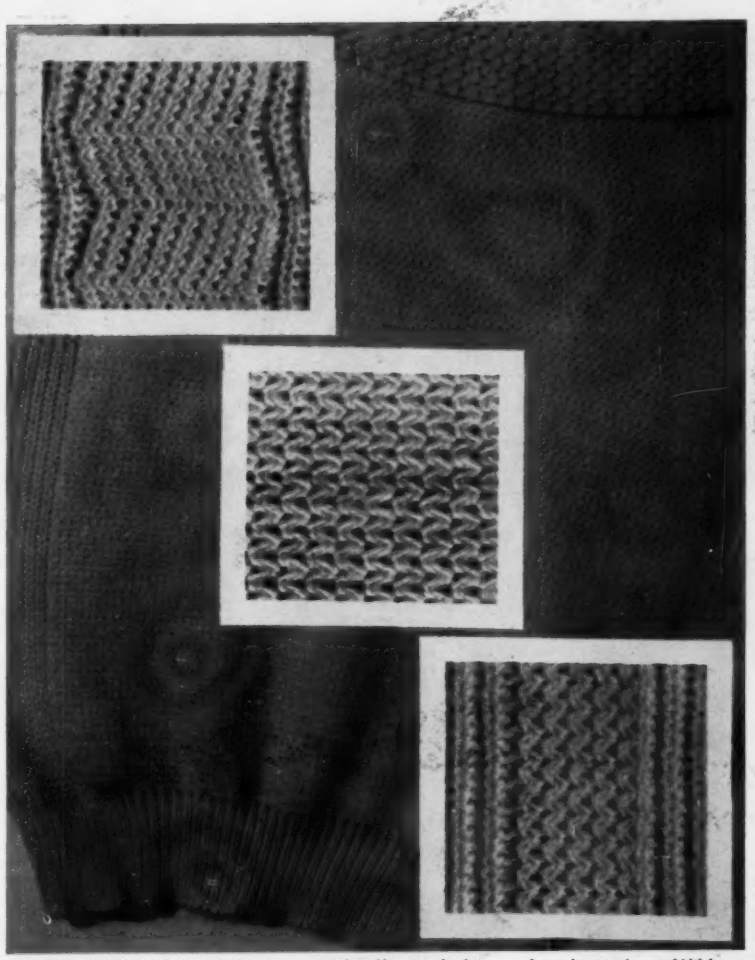
ceeding feed where normally the needles are held in a welt position by the action of the machine's cams. By operating the rack cam motion and observing this space between feeds during the period of the actual racking cycle, it will be observed that there are certain needles which are not intermeshed. These needles can then be used for making the rack stitches. The remaining intermeshed needles must be rearranged (spaced) to allow enough room between needles for the rack movement.

By varying the sequence of the knitting feeds (for instance on a 12-feed machine, the feeds could be arranged: two feeds knitting, one feed welting, two feeds knitting, one feed welting, etc.), a wider space of welted needles is obtained between one knitting feed and its preceding knitting feed, resulting in a wider racking area. (See illustration showing wide rack panel on sweater.)

Racking completely around the machine is possible by arranging all the knitting feeds on one half of the machine while the feeds on the opposite half of that machine are kept in welt position. When arranging the feeds in this manner, it is necessary that the needle set-up be so that on one half of the machine the needles are spaced to allow the intermeshed knitting needles to rack without interference.

The opposite half of the machine has the needles spaced in the same manner but this entire set is moved one needle slot to the right (or left) so that none of the needles in this half of the machine is diametrically opposite any of the needles in the other half of the machine.

In addition to the large variety of rack effects possible by using the arrangements mentioned above, it is also possible to obtain unusual effects by selecting the type of stitch being knitted while the racking is being performed. A tuck stitch, for instance, when used in combination with racking, produces an open, lace type fabric.



These are only a few of the many rack effects which may be obtained on Wildman Jacquard Model TA, TAI, and TJI circular knitting machines without special attachments.

Most rack type fabrics can be knitted with a selected rib cuff, it was explained, but in order to do this easily, a carefully thought out needle set-out must be used.

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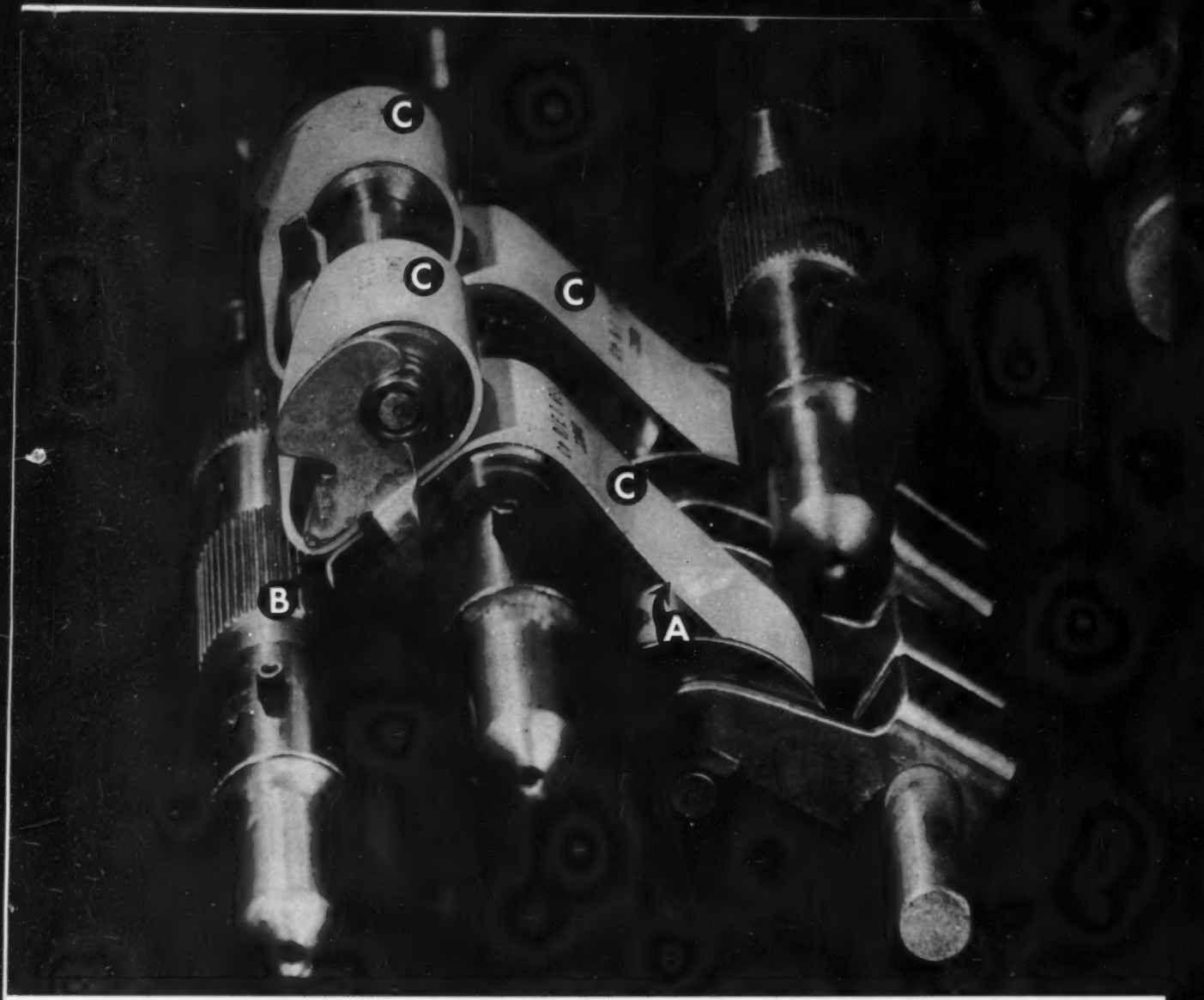

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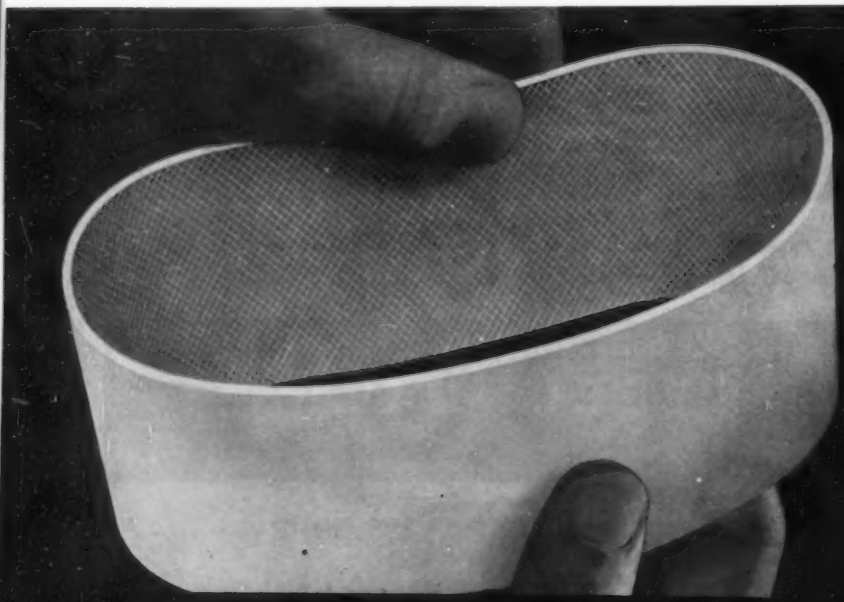

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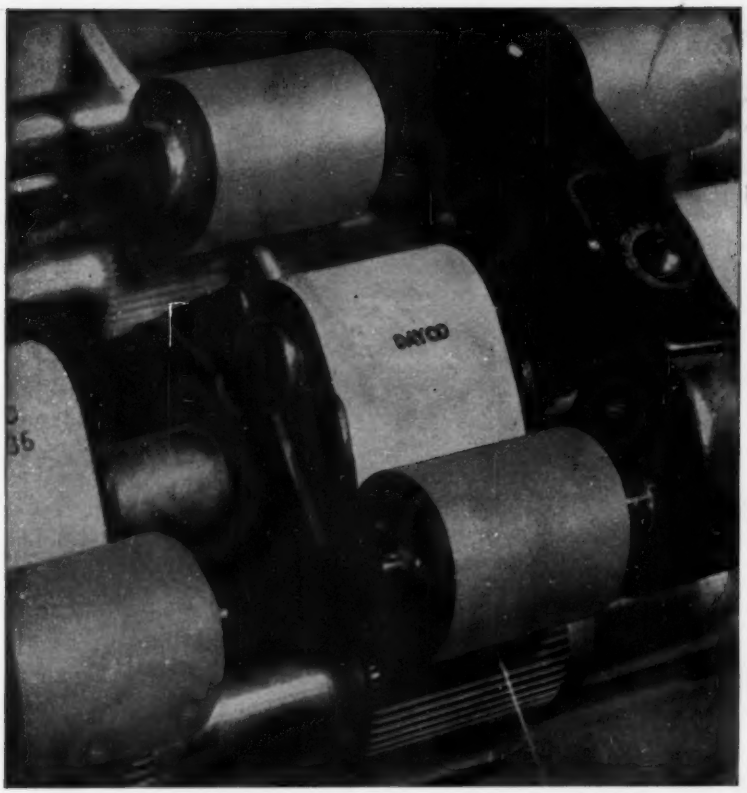

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by KEEVER

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HOW OTHERS MANAGE

Tips on printing aniline black—a reply

THE EDITORS:

In regard to your article in the June, 1960, issue of TEXTILE INDUSTRIES on aniline black and rose aniline, I mention some practical problems which I have encountered. I recall encountering in my earlier years of aniline black printing all of the problems pointed out—doctor streaks, rose aniline, tendering of the cloth.

To understand what was going on, we understook to research each problem, and after careful examination we found the aniline black formulation was acidic when it went to the printing machine. This we corrected by proper addition of aniline oil to the aniline salt until the neutral point was reached. Much as we expected, we saw an improvement in the running quality of aniline black at the print machine, whereby streaks were reduced to a minimum and running time was increased considerably.

In printing aniline black with vat colors, it soon became apparent that if one prints aniline black first, and vat colors second, there is improper resist where the two colors meet. A third color will occur at this particular point, but when one reverses the process—that is, prints vat colors first, then aniline black—a complete resist does occur and a perfect print is the result.

This is due, in my judgment, to the fact that the first color printed is as nearly completely absorbed as is possible by the innermost part of the fabric. So the second colors cannot reach into the innermost part of the fabric due to the repellency caused by the absorption of the first color. Under such a situation, chemical action cannot occur properly, and therefore complete resist is retarded by physical action.

In printing vat colors first and aniline black second, we soon noticed that regardless of how carefully a printer lints the aniline black roller, some vat color, however minute, would find its way into the aniline black color box.

This gave us cause for alarm, until by careful observation we noticed that a measure of the undesirable chemicals—that is, hydro and alkali—can be absorbed by the aniline black before any detrimental effects occur. Much to

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Every kink, short-cut, time-saver, or quality improvement suggestion entered in the contest will be paid for immediately upon acceptance and the $100 award will be made as soon as all entries are judged.

The contest rules are simple:

► All contributions must be postmarked not later than midnight, August 15, 1960.

► No limit to the number of entries an individual may submit in any one contest.

► All entries paid for upon acceptance — no waiting. Extra payment for photographs that are usable. Extra consideration is also given kinks accompanied by legible pencil sketches or drawings.

► Entries must not have been published previously and must not be submitted to any other publication.

Send your contest entry to: The Editors, TEXTILE INDUSTRIES, 806 Peachtree St., N. E., Atlanta 8, Georgia.

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our surprise, the running quality of aniline black under such conditions was excellent, with the resultant runs becoming considerably longer and free from any doctor streaks.

A small amount of alkali will, in my judgment, retard oxidation and neutralize acidity in the aniline black and also help the running qualities.

The problem of tendering seems to vary at the finish print product —that is, after printing, aging, and washing. We noticed also that waiting too long prior to aging and washing would have a tendency to tender the cloth more or less. This gave us grave concern. In an attempt to overcome this handicap, we soon discovered that an additive known as Kollamine in our formula was beneficial to the tendering action.

Aging as soon as possible after the goods were printed was of great help and also washing as soon as possible. These are three main points to watch when printing aniline black. Again I state the chemical action of aniline black is best if one will print, age, and wash the cloths as soon as possible.

Our experience with rose pink aniline was a problem which we undertook to solve by the process of elimination. Thus, we found that the formulation was correct. Printing was all right. Drying was found to be the culprit that caused rose pink aniline—that is, overdrying in the print drying chamber.

That rose aniline is not apparent at the printing stage, nor at the aging stage, but shows up at the washing stage is very misleading and a little hard to pinpoint.

However, our experience soon revealed that to overdry aniline black in the print dryer, will improperly fix or oxidize part of the color on the surface of the cloth, whereby it becomes too large in molecular structure to be absorbed by the inner parts of the fibers. This unabsorbed color dissolves in the washer as a pink color and tints the ground (or unprinted areas), the condition known in textile print circles as rose aniline.

In bleaching this tint, one will naturally have a prorata loss of the brilliant aniline black. To control rose aniline, experience soon revealed that the color must come out of the print drying chamber either a grayish-white or a light green shade, which is to say that moisture from its formulation should be present before aging. The sooner the aging after printing, the better the safety and color value of aniline black.

All the above problems we watched closely for a period of time, and our findings were that cotton fabrics suffered a greater loss in all these faults than synthetics. One has an all-around degree of safety greater in synthetics than cotton.

The problems of proper working formulation of aniline black, elimination of rose aniline, and avoiding doctor streaks can be somewhat controlled by the printing department. Tendering, however, goes beyond the printing stage and appears again in some resin finishes, which seem to combine with aniline black to tender the fabrics.

CONTRIBUTOR No. 1247

Hydraulic dolly saves fixer's back

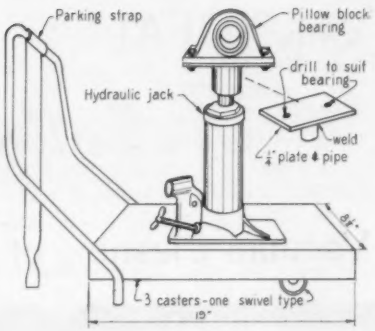
THE EDITORS:

We often have to remove one end of our warps from our XL looms to give the fixers room to replace a pick shaft box, repair a pick clock drive, etc. Since the beams are often almost fully loaded, two or three men are extended just putting the warp back into the loom.

There was always some lost time resulting from the fixer having to round up his "helpers." There were always too many sore muscles and too many exposures to back injury in the process.

I made a three-wheel dolly that takes almost all the human effort out of that task. On the dolly, centered among the three wheels for balance, I bolted a hydraulic jack.

I secured a ball-bearing pillow block with a bore large enough to



fit over the beam gudgeons (any similar device will do) and bolted it onto a metal plate to which we had welded a short length of pipe big enough for the jack lift post.

Now, when a fixer wishes to lift one end of a warp beam out of the loom, he pries the opposite gudgeon from its deep groove and rests it in the shallow one. Then he hangs the pillow block onto the gudgeon of the end he wishes to lift, wheels the jack under the bearing, and pumps the jack until it fits into the pipe sleeve under the bearing. This secures the load to the jack so well that the fixer simply pumps until the beam is free and swings the dolly into the alley. To make it easy to maneuver the dolly under the load and in the narrow warp alleys, I used a swivel caster under the front of the dolly and two fixed casters under the rear.

CONTRIBUTOR No. 1250

Dynel rescues wet processor

Coronet Piece Dye Works, Elmhurst, L. I., N. Y., enjoys substantial economies in material and maintenance costs in standard dyeing operations through use of dye reel covers and extractor bags of dynel fabric. The commercial dyeing plant, which dyes all types of tubular knit goods (including cottons, woolens, and synthetics) on a production basis, uses fabric woven of modacrylic fiber to cover the stainless steel overhead winch reels in each of its 10-foot dye boxes. The covers protect knit fabrics while they are being dyed.

The 100 per cent dynel, 12-ounce fabric, stands up exception-

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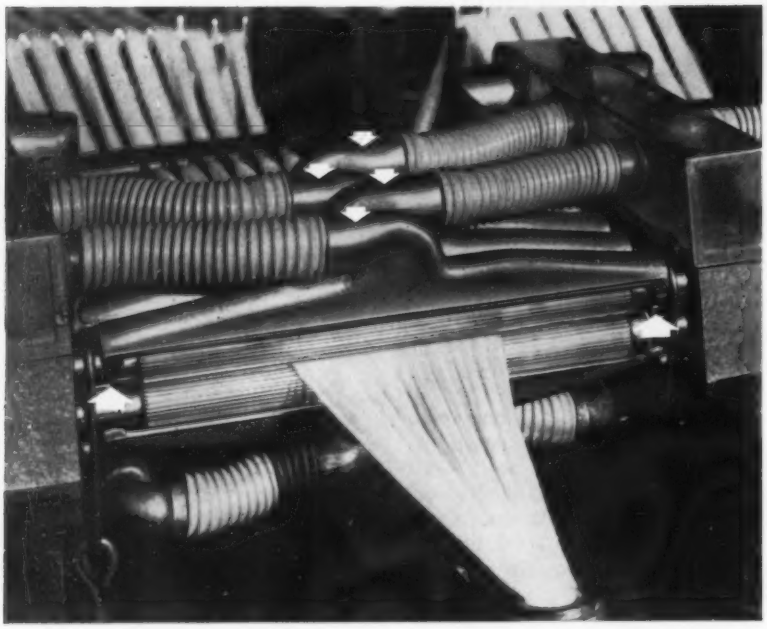

Each frame has its individual vacuum cleaning system and each top and bottom roll has its own close-fitting suction cleaning hood which extends over the entire length of the flute and the roll journals as well. These eliminate bottom and top clearers and wiper or rubbing parts, and all clearer and roll neck picking. They keep clearer slubs from entering the stock and remove a greater percentage of dirt, trash, and fly. Because the vacuum acts on the roll instead of the web, it does not remove good staple. The Ideal Vacuum System also keeps rolls cool at high speeds.

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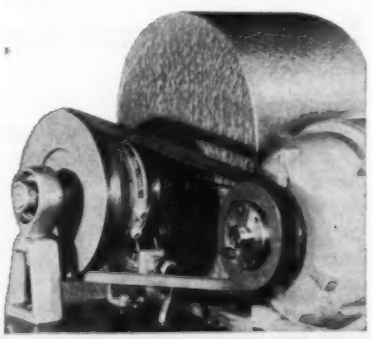

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ally well to the unusually heavy abrasion received in the process. According to Charles Schoenrock, plant manager, the average life of such a cover is six months or better compared to about 30 days for heavy duck cloth previously used for the purpose. Although the fabric is three times the cost of the cotton cloth, its life-to-cost ratio is at least double, he points out.

Even more important from the dyer's view are the savings in production costs and man hours by eliminating the annoying job of frequently replacing the 100 square foot reel covers. Every change means a half-day shutdown for the dye box, each of which holds a dye run of from 400 to 700 pounds of goods at a time.

In addition to its high abrasion factor, it is also inherently inert to acids and other chemicals. Thus sodium hypochlorite used in washing the reels and sodium chlorite used in bleaching of synthetics have no effect on the cover's strength. Also it is unaffected by many types of dyes or coloring materials at the temperatures used, thereby eliminating many problems in changing from one color

to another in dye-lots. In dyeing rayon or cotton goods, for example, the colors do not affect the reel covers and stripping is not necessary.

Coronet has been testing the covers for several years and recently began to employ them on all of its reels.

The plant also uses the bags to hold dyed pieces in the extractor to prevent possible bleeding or crocking.

UNION CARBIDE CHEMICALS CO.

Handle big batteries without help

THE EDITORS:

Electric lift truck batteries weighing over 1,000 pounds are most difficult to handle without mechanical assistance. The North Carolina Finishing Company has designed a wheel cart which allows the operator to remove and install lift truck batteries alone.

The cart is the same height as the bottom of the battery case on the lift truck. It is made with stationary rollers to serve as the bottom on which the battery rests to permit easy loading and unloading merely by pushing the battery. A simple brake prevents the cart from moving while the transfer operation is in progress.

The operator merely disconnects the leads, pushes the cart against the lift truck, and slides the battery out onto the rollers. The cart is then pushed to the battery charger. The lift operator then secures an already charged battery, which is still on a cart, positions it against the lift truck, and pushes the battery into location. The entire operation requires less than five minutes.

The cart also provides a means of transporting batteries and serves as a work stand for maintenance and repair work. Many man-hours have been saved by this truck, and a safety hazard eliminated as well.

CONTRIBUTOR NO. 1248

Repairs for dented fiber cans

THE EDITORS:

Here is an easy method of repairing fiber card cans dented and sunk in at the sides: The card can is soaked in water, and after the fiber becomes pliable, it is filled and packed with sand. The dents and depressions are opened out and the cans are thus corrected. The sand is then emptied and the cans dried.

CONTRIBUTOR NO. 1193
(India)

Uses broken hack saw blades

THE EDITORS:

Our bench fitter keeps all the broken hacksaw blades that tend to accumulate around his work bench. He uses the pieces.

Since most of the short pieces were too small to be used in a regular frame, we improvised a frame that would allow him to use all the serviceable short lengths.

Into the end opposite the frame

Grimy Mill Floors are Expensive

Think you're saving money if you let your floors go? Like this? Well, you're not. Here's why.

Foot traffic and rolling equipment grind dirt into improperly finished floors, marring the wood, embedding grit in the surface. Oil and grease from machines leave ugly stains and slick surfaces. If you wet-mop such a wood floor, it deteriorates rapidly. Sanding is no solution since the average maple floor has to be completely replaced after about four sandings.

But, as many of our customers know, there's an easier and more economical way to maintain mill floors.

Minnesota-Treated Floors Look Nicer, Last Longer

Mill floors treated with Minnesota Paints products are tough, stain resistant, dirt resistant, waterproof, long wearing, and attractive. And, they require very little attention to stay that way.

Minnesota tung oil floor sealers and special synthetic resin finishes protect and beautify any good wood floor. Minnesota-treated floors require less scrubbing, less sanding, and less refinishing. Minnesota-finished floors are not maintenance-free, but the regular, dry cotton mop buffing recommended is light, fast, easy.

Minnesota Paints' staff has had years of experience with textile mill floor finishing problems. Call or write for a service demonstration. No obligation. *Call* PLaza 3-5151, Atlanta, Georgia; or *write* Minnesota Paints, Inc., 1314 Murphy Ave. S. W., Atlanta. Our floor experts will show you how to reduce floor maintenance costs while making your floors last longer and look nicer.

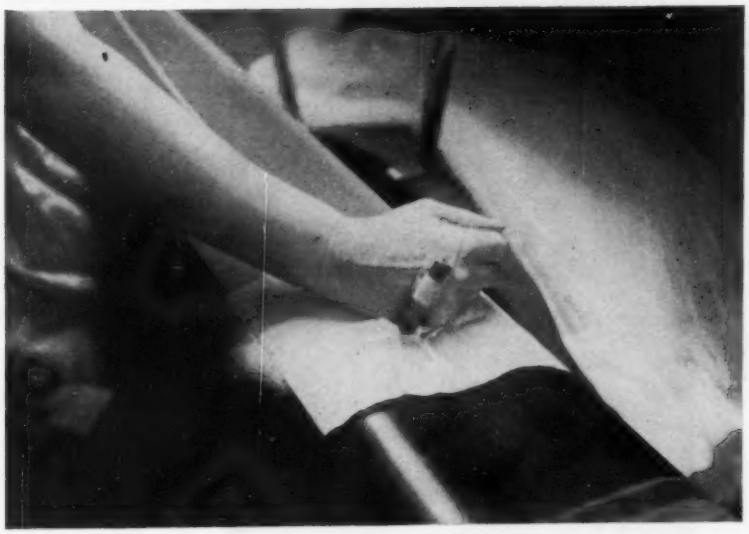
Minnesota PAINTS

MINNESOTA PAINTS, INC.
MINNEAPOLIS 15, MINNESOTA
PLANTS: *ATLANTA • MINNEAPOLIS • FT. WAYNE • DALLAS*

handle we fitted an adjusting screw, complete with pin to fit into the blade "eyelet," that was long enough to take up the waste space normally occupied by a full-length blade. We drill holes in the short pieces and use them on small jobs.

CONTRIBUTOR No. 1214
(*India*)

Keeps inspector's crayon handy



THE EDITORS:

We have prepared crayon holders for our inspectors. They slip their hands into the elastic bands (photograph) onto which are sewed loops for holding the marking crayons. The inspectors merely need to roll their hands to bring the crayon into marking position.

CONTRIBUTOR No. 1251

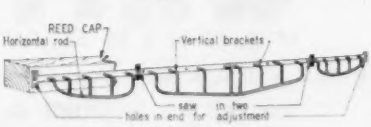
Heavy-duty, all-purpose shuttle guard

THE EDITORS:

All of our looms are equipped with two shuttle guards, a conventional guard and one called an auxiliary. These are quite expensive and have a tendency to break easily. I have improved on the design and have built a strong guard that gives adequate protection but allows the weaver to work around it without difficulty.

I built it in three sections to fit an 82" loom—actually I made it in one piece and sawed it into three sections because it was easier done that way. I made the end sections (see drawing) adjustable so that they may be set above the temples according to taste. Either section can be removed and set aside to give ample freedom in repairing major smashes.

I sawed the guard in two by cutting through the hole I had drilled to fit the existing hole in the lay (there are four in our loom lays, one at each sword and two spaced between them) and made a clamp to work with the bolts at those points and hold both ends of the guard. The clamps are shown with black tips at the ends of the arrows leading from "saw in two" in the drawing notes. I also show auxiliary screw holes in the center portion, and these may be spaced to suit or omitted entirely.



I used a piece of flat iron to fit against the lay, and I welded a "T" of the same iron (1" wide, ¼" thick) at each end of the guard and drilled three holes through each "T" to make the ends adjustable over the temple area.

The balance of the guard is made of ⅜" cold rolled steel, with the bracket lengths determined with the loom on front center so we could study the guard position above the cloth.

I have purposely omitted dimensions, since each size loom will have to have guards tailored to meet local requirements.

CONTRIBUTOR No. 1249

Corrugated cartons for carpets

Magee Carpet Company, Bloomsburg, Pennsylvania, is shipping carpeting in rolls weighing 1,000 pounds and up to 15 feet in length in corrugated boxes instead of the plywood or fibre cleated boxes formerly used. Recently, Magee changed to laminated burlap for certain grades of carpet and corrugated for the better grades.

These advantages and savings have resulted from the change to the new corrugated box:

(1) Four fewer men are needed in the box set-up job; (2) storage area required for packaging material has been reduced approximately thirty per cent; (3) splinter danger is eliminated as boxes are now closed with pneumatic strapping equipment; (4) the corrugated container makes it unnecessary to wrap the carpet in craft paper; (5) a special cut-out flap in the center of the box makes warehouse handling much more convenient. The smooth sides of the corrugated package perform well on conveying equipment and eliminate damage to the containers in the warehouse; (6) the double wall end panels of the corrugated container prevent rolls of carpeting from telescoping through the

HIGH
IN PRODUCTION

LOW
INITIAL COST . . . and

compact in design

. . . . . W . . .

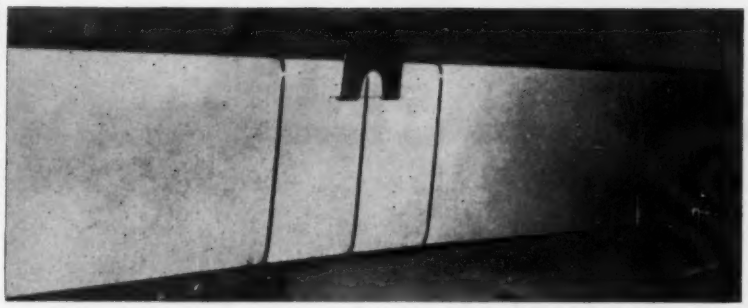
the new Whitin STANDARD spinning frame

Like the new "compact" cars which have captured the imagination of the automotive world, the new Whitin Standard Spinning frame is arousing great enthusiasm in spinning circles everywhere. Built into the new Standard are all the tested components and assemblies already proven on millions of spindles of Whitin spinning throughout the industry. Here is a modern, complete narrow frame especially designed to give you dependable, high production spinning at relatively low initial cost. Why not let us send you detailed information on the new compact Whitin Standard — it's an unusual frame — an unusual spinning value.

WHITIN
MACHINE WORKS

WHITINSVILLE • MASSACHUSETTS

CHARLOTTE, N. C. • ATLANTA, GA. • DEXTER, ME.
GREENSBORO, N. C. • SPARTANBURG, S. C.



ends of the box; (7) the extra-strong box sides provide ample stacking strength—boxes can be stacked 4 to 5 high; (8) carpets are not torn by nails as frequently occurred when plywood boxes were used; and (9) Magee distributors find the corrugated boxes handy for storing remnant rolls.

By cutting the end panel, a distributor can stack the boxes one on another for storage for these remnants. The box can also stand on end if the distributor prefers to store the carpet in this manner.

About 30 car loads of these boxes have been shipped from Magee without appreciable damage.

Mill uses for office copying machine

THE EDITORS:

A recent survey of the use, or nonuse, of our copying machine showed that this costly piece of equipment was actually in use less than two hours each month. As the result of the suggestion that the machine be utilized, we adopted a method that eliminates dictating, typing, proofreading, and correcting and cuts letter-reply time by 50 per cent. The method entails five steps:

1. Reading the incoming letter
2. Writing the reply on the margins of the letter
3. Running the letter through the copying machine
4. Mailing the copy
5. Filing the original

Contrast that method with the conventional manner of replying to correspondence:

1. Reading the incoming letter
2. Rereading it prior to dictating the reply
3. Dictating the reply
4. Typing the reply
5. Proofreading and signing
6. Mailing the reply
7. Clipping carbon to original and filing them as one

The first method requires less than five minutes, while the second takes at least 12. There is a saving in filing space when only one sheet instead of the usual two is filed and this is advantageous where correspondence is microfilmed. For the originator of the letter, the machine copying method makes it unnecessary for him to remove the filed copy of his letter when he receives the reply.

With the proof of the copying machine's ability to save us money in the informal correspondence between mills and/or home office in mind, we looked for other areas in which it could be used and found one in the accounting department. For instance:

1. Letters requesting payment of specific invoices or account are answered directly on the letter if the account is in the process of being paid or has been paid. We felt the handwritten reply would not be offensive, and indeed it proved to be an added personal touch.

2. Wherever a definite commitment had been received concerning payment of account had failed to materialize, a "gentle" or "friendly" reminder on the customer's own letterhead usually brings the desired result, the payment.

Intercompany correspondence we qualified to include personnel matters and wherever a detailed explanation or information "overcame" the margin space.

Sales, order writing, and scheduling departments were not involved in the use of the copying machine as an aid to letter writing. However, customers' orders were duly acknowledged in the form of the acknowledgement copy in the order-billing set unless some additional information was required in connection with colors and scheduling, in which event customers' orders were duly acknowledged by dictated letter.

Cost of letter-writing varies with the type and length of letters; however, a one-page, two- to three-short-paragraph letter was found to cost 35¢ per letter, and this cost included the time of both the person dictating the letter and the person transcribing or typing same. Dictaphone equipment costs including depreciation, records, and current used was also taken into consideration as well as the cost of printed letterheads, copy paper, carbon paper, envelopes, and postage.

Compare this with the cost of copying—carefully computed at 15¢ per letter on the same aforementioned letter-length. This includes the time to hand-write replies, time to produce copies, cost of copying machine (including depreciation and current used as well as the single greatest cost, negative printing paper at 5¢ per letter-size sheet).

From the foregoing one can determine that a savings in the cost of 60 per cent resulted in the use of a copying machine over the conventional way of replying to correspondence. The savings in time remains as stated at the outset of this article, at 50 per cent.

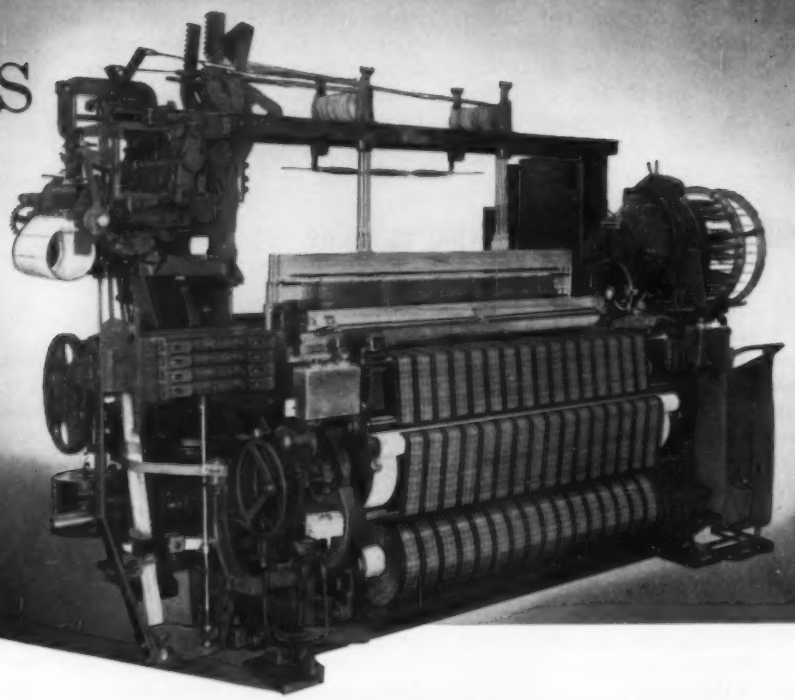
CONTRIBUTOR No. 1246

"Who can make it?"

. . . . an industrial tape that will adhere tightly and for long periods (months) to fabrics coated with latex and similar materials? It should be possible to loosen and restick the tape.

CONTRIBUTOR No. 1256

Here's the 4-Color Fully Automatic Loom for Fine Filament Fabrics



THE C&K C-7S WITH 4-COLOR ROTARY MAGAZINE

FEATURES
of the C-7S Loom:

- Push button electric controls
- Electric protection
- 4-color rotary magazine for 36 bobbins
- Flight-type optical electronic feeler
- Punched pattern indication

This new C-7S Loom offers mills weaving fine filament fabrics the opportunity to maintain a new degree of consistent high quality . . . at consistent low costs.

Besides the features at the left there are many other engineering advances that result in the remarkable performance characteristics of this new loom.

We would like to arrange for you a more complete demonstration of the C-7S Loom than was possible at the American Textile Machinery Exhibition. In the meantime, let us send you the C-7S descriptive literature.

MANUFACTURERS OF THE WORLD'S LONGEST LINE OF AUTOMATIC BOX LOOMS

CROMPTON & KNOWLES CORPORATION
C&K
WORCESTER, MASS. U.S.A.

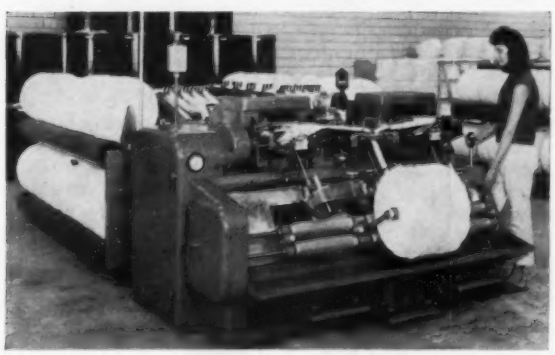
Charlotte, N.C. • Allentown, Pa. • Crompton & Knowles, Jacquard Supply Co., Pawtucket, R.I. • Crompton & Knowles of Canada Limited, Montreal, Que.

NEW PRODUCT PARADE

Please note: Claims made in all of these announcements of new developments are of necessity based upon information furnished by the respective suppliers.—The Editors.

Rugged, high-output worsted preparatory machines

ABOVE—ParaDrafter with Autoevener. BELOW—ParaBlender.



Now commercially available is the Roberts-Tematex line of machines for high speed, dependable, and economical pinning, parallelizing, drafting, and blending of worsted and man-made fibers in spinning mills and combing and top making plants. Included in the line are the following:

1. The ParaDrafter for parallelizing and drafting long fibers. Available in single, bicoil, dual, and quad delivery models, the machine offers a net production of up to 320 lb/hr in cans or on balls.

2. The ParaDrafter with Autoevener, a single head, single delivery ParaDrafter with an electronic-mechanical control unit which automatically and instantaneously corrects delivered sliver weight to within plus or minus 1% from an entering variation of up to plus or minus 20%.

3. The ParaBlender which consists of two ParaDrafter heads with a unique and simple arrangement for combining and sandwich blending delivered sliver from both heads onto a center ball delivery which receives pressure spray oiling. This provides a large number of doublings plus melange blending of a high number of slivers. Individual ball delivery permits the machine to be used as two parallel ParaDrafters.

Ruggedness is an outstanding construction feature of the machines. Others are: hydraulic weighting of delivery rolls, hydraulic lifting of head for faller bar inspection, simple changing of draft and pressures, complete stop motion with indicator board to show location of stoppage, gradual introduction of fallers into sliver, shock absorbers for faller drops, and an 8"-wide pinning field as standard.

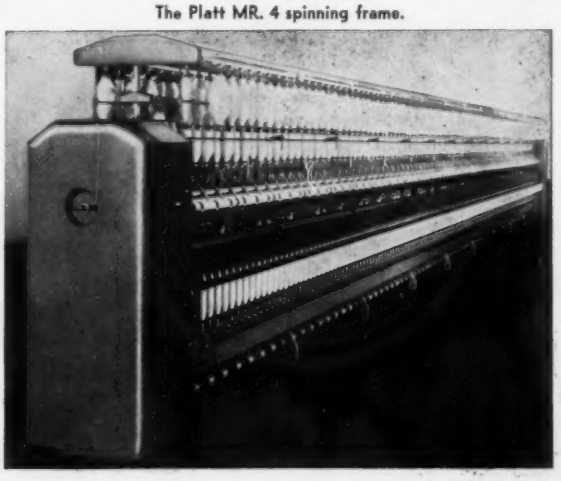
Roberts Co., Sanford, N. C.

Do you want more data? Write ◂ or use card on page 193; list H-101

General-purpose, high efficiency narrow frame

The new Platt MR.4 narrow (28" wide) ring spinning frame is an all-count, general-purpose, high-efficiency machine with considerable inherent flexibility and excellent performance in production and quality. Easy to operate and maintain, the frame includes the SpinSaVac system of broken end collection as standard equipment, although front underclearers can be provided if desired. The filter box, together with fan and motor, are located

The Platt MR. 4 spinning frame.



compactly within the off-end.

More favorable spinning angles, lower yarn tension, reduced end breakage rate, and a better balanced yarn balloon throughout the package build are results of the frame's design. Roller stand angle is 45 degrees, and various drafting systems are available.

Greater use of anti-friction bearings, a new method of ring rail balancing, Platt "anti-wedge" rings, and elliptical travelers are other construction features.

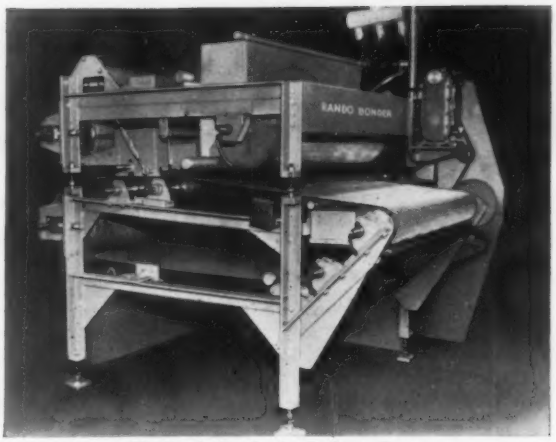
Atkinson, Haserick & Co., Inc., Box 509, Framingham, Mass.

Do you want more data? Write ☁ or use card on page 193; list H-102

Uniformly applies chemicals to nonwovens

A versatile, compact, yet readily accessible, high production machine for applying chemicals of a wide variety to nonwoven, felt, woven, and specialty fabrics was recently introduced. Called the "Rando-Bonder," it provides uniform penetration and controlled pick-up without distorting the base web structure.

Principal construction features of the machine are as follows: (1) Horizontal design of fiber treatment zone to minimize distortion of uniform fiber lay; (2) open construction for accessibility, observation, and control of chemical application; (3) self-contained and fully functional, the machine can be completely dismantled by two men in 20 min without tools; (4) all parts coming in contact with chemicals are fabricated from stainless steel to avoid corrosion; (5) operates in conjunction with a compact chemical feed system; (6) all unused binder materials are continuously removed and returned to the chemical feed system.



The Rando-Bonder by Curlator Corp.

The fabric structure or web to be chemically treated is continuously fed onto the bottom screen conveyor. The top screen, maintaining the same surface speed, then engages and holds the web in position. The material encased between the screen conveyors moves forward through a pretreatment (wetting agent) zone and chemical treatment zone in a horizontal position After the chemicals are applied, the top screen is removed from the material which then travels through an equalizing zone prior to vacuum extraction. By means of controls the wet pick-up is reduced to a predetermined

• *Supervision*

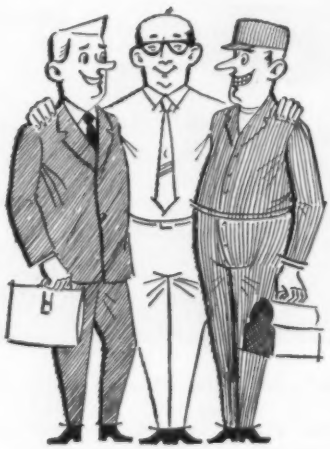
• *Control*

• *Management*

SOMETHING

FOR THE

WHOLE TEAM



at the **21***st Biennial*

SOUTHERN TEXTILE EXPOSITION

OCTOBER 3-7 • 350 EXHIBITORS

TEXTILE HALL — GREENVILLE, SOUTH CAROLINA

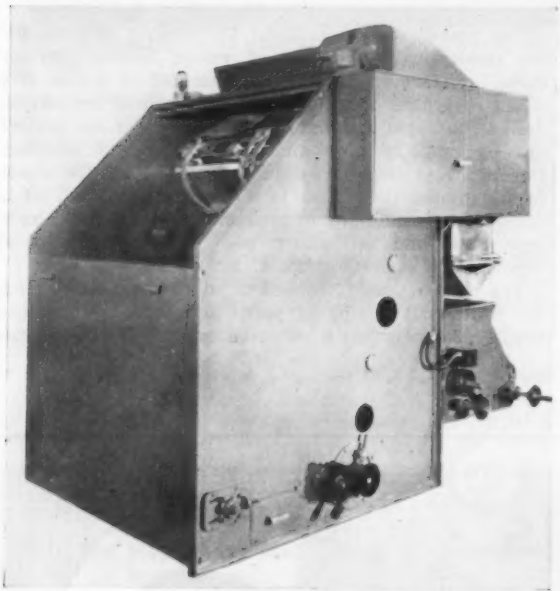
amount. The chemically treated material then usually passes directly into a standard conveyor drying unit where the binder is set and the chemically treated material is stabilized.

The chemical feed system is designed as a package unit; therefore, it is available as a separate item for installation on other processing line or chemical compounding equipment in minimum time. Vacuum extraction, temperature control, and jacketed units may be obtained.

Curlator Corp., 501 W. Commercial St., East Rochester, N. Y.

Do you want more data? Write ◂ or use card on page 193; list H-103

Accurate automatic weighing card-picker feeder



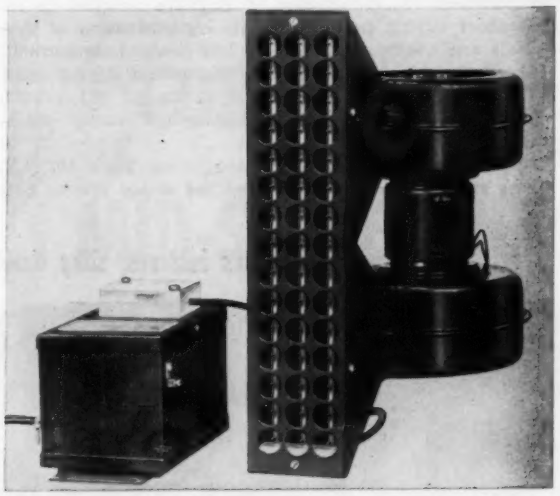
The dump-to-dump accuracy of a new automatic weighing feeder for wool cards, garnetts, and cotton system pickers is less than 2½ per cent total variation. This metering accuracy indicates the degree of opening accomplished between the comb and the apron pins of the machine which is known as the "Unifeeder." Available in 48-, 60-, 72-, and 84-inch widths, the unit will accommodate any fiber, natural or synthetic. It is simple in design and thus is economical to operate and maintain.

The effect of the variation along with any uneven loading over the length of the weigh pan is minimized by the action of the column former in combining succeeding dumps. The result is a mat of stock that is uniform in weight and density being consistently introduced to the feed rolls. An automatic speed changing system prevents light weights being presented to the column former because of fiber runout.

Some of the construction features are: (1) visual "low stock level" warning; (2) totally enclosed motor with self-adjusting brake; (3) fewer parts in power transmission train; (4) speed of lifting apron is manually adjustable through a 2½ to 1 range while the machine is running; (5) beam scale suspension in low torque, instrument-type, sealed ball bearings; (6) air-cylinder-actuated weigh pan.

Fiber Controls Corp., Box 1358, Gastonia, N. C.

Do you want more data? Write ◂ or use card on page 193; list H-104



Solves static problems where bars can't be used

The "Aerostat Blower Ionizer" provides wide area static electricity neutralization, allowing textile materials to be processed through machinery without static interference in areas where conventional static bars cannot be placed because of space limitation.

Aerostats blowing from each side across a loom in a weaving area will discharge both the warp and filling yarns. On knitting machines and narrow fabric looms the unit can provide static elimination in the confined areas where space is not available to accommodate standard static bars. On creels a series of Aerostats mounted vertically along one side of each wing will sometimes cost less than the conventional arrangement with a static bar at each eyelet bar.

The device consists of a centrifugal blower with a static eliminator installed in the exhaust pipe. The blast of air from the blower propels the ions formed by the static eliminator up to 4 feet from the exhaust duct.

The Simco Co., 920 Walnut St., Lansdale, Pa.

Do you want more data? Write ◂ or use card on page 193; list H-105

Efficiently air-dries loose textiles

The Schilde air penetration dryer, utilizing a conveyor belt fed by a box-type feeder and sealed so that the drying air is forced through the material, is recommended for drying all types of loose textiles.

Among its advantages are: (1) maximum specific

evaporation; (2) elimination of invisible material losses; (3) short drying periods; (4) no contamination of materials and heated surfaces; (5) low power consumption; (6) expandable by fitting on standardized drying cells; (7) particularly low air and heat losses; (8) robust, space-saving design; (9) accessible and easily maintained and cleaned.

Cosa Corp., 405 Lexington Ave., New York 17, N.Y.

Do you want more data? Write ◂ or use card on page 193; list H-106

Gives pile fabrics lustrous, silky hand

The Heinz Hergert "Pol-Rotor," a German-made finishing machine which is now available through a U. S. agent, imparts a lustrous finish and soft, silky hand to (1) knitted high-pile fabrics used as imitation fur and (2) face-finished woolens used in women's wear. It is simple and economical to operate, using comparatively little power and heating to operating temperatures very quickly.

The machine consists of an aluminum alloy, electrically heated cylinder containing special grooves or slats in the cylinder face—depending on the type of fabric handled. While the cylinder rotates at a high speed, an endless felt apron holds the fabric in contact with the cylinder. The cylinder speed, grooves, and the heat combine to remove fiber crimp, an action that gives woolens a lustrous, silky hand.

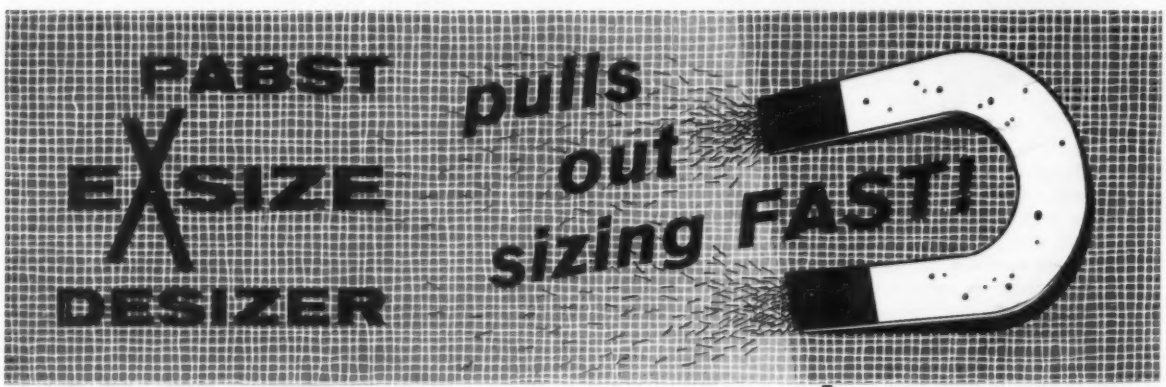
Woolart Mills, Inc., 419 Park Avenue South, New York 16, N.Y.

Do you want more data? Write ◂ or use card on page 193; list H-107

No premature oxidation with this vat dyeing unit

The Standfast Molten Metal Vat Dyeing Machine for the continuous vat dyeing of woven fabrics provides these advantages: (1) level squeeze off of excess dye liquor regardless of the width of the fabric or the surface design; (2) rapid dye fixation as a result of the perfect heat exchange from the metal to the fabric; (3) complete freedom from premature oxidation troubles, as the whole dyeing process takes place in the molten metal and air is excluded; (4) continuity of production; (5) excellent shade production and uniformity with predetermination of formula on a laboratory model.

The machine, modifications of which are available for the continuous dyeing of yarns and tapes, utilizes the design principle that a small volume of dye liquor can

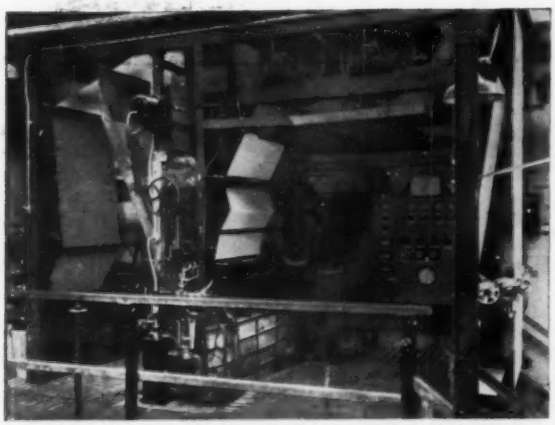


Pabst Exsize takes the starch out of cotton fabrics in a hurry! That's because its built-in heat stability makes Exsize work especially well in high-speed desizing ranges. It's uniform too. Every lot is carefully controlled for uniform enzyme activity and always gives you the same safe, speedy action. Order Exsize soon for the best finishing you've ever had.

SAFE · SURE · DEPENDABLE

Write for free Desizing Manual

PABST BREWING COMPANY
Industrial Products Division
MERCHANDISE MART · CHICAGO 54, ILLINOIS



Mill installation of the Standfast molten metal vat dyeing unit.

be floated on the surface of a molten metal bath. By passing the fabric to be dyed down through the dye liquor and through the molten metal a regular and even pickup of the dye liquor is achieved by the fluid pressure of the molten metal on the fabric.

As the whole dyeing system is very rapidly cleaned between shades (5 to 7 minutes by the leuco dyeing technique), short runs also can be dyed quite economically, as well as the longer yardages usually associated with continuous dyeing. Built by Mather & Platt for Standfast Dyers & Printers Ltd., the machine is available in the U. S. through:

Atkinson, Haserick & Co., Inc., Box 509, Framingham, Mass.

Do you want more data? Write ◂ or use card on page 193; list H-108

Designs unlimited on 24-feed Jacquard knitter

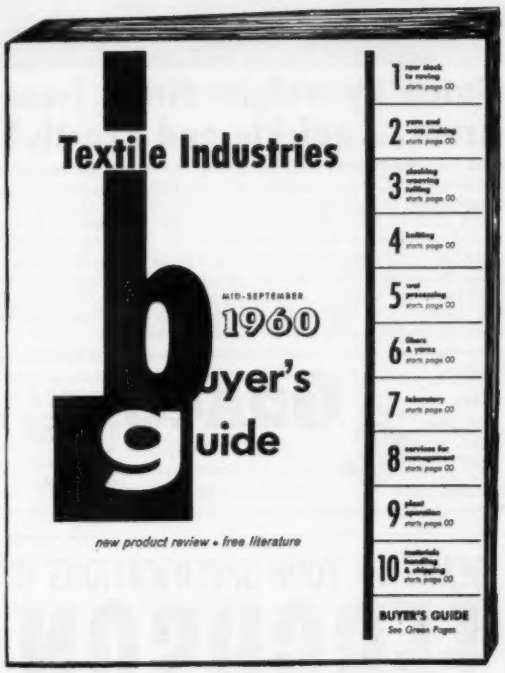
A new 30" diameter yard goods knitting machine employs 24 Jacquard feeds for knitting individual needle selective designs. Available with single needle control up to 14-¼ needles per inch and double needle control for finer cuts, the Model JSD-24 machine is jig drilled for the mounting of a control stand which can be used to control the operation of up to 12 four-color yarn changers. Another feature is the availability of replaceable cylinder sections to provide 36 cylinder knitting feeds for the high production of special blister stitch fabrics.

The machine offers 24-feed production of Jacquard fabrics with unlimited design possibilities in twill back, pique, blister stitch, raised welt, jersey, full rib, and two, three, or four color welt back stitch. Individual stitch cams may be adjusted independently to obtain stitch balance.

The dial cap is jig drilled to permit the rearranging of dial camming, and each dial swing cam may be manually set for knit, tuck or welt position. This machine uses the double butt type dial needles, and manually-operated auxiliary back camming adds to the versatility of the machine. The cylinder gate cams are manually operated and may be set for knit, tuck or welt position.

The Jacquard mechanism can be manually started and stopped as required. Each Jacquard automat is arranged so that the Jacquard pattern cards can be removed and replaced quickly and easily. The machine is equipped with the standard width 5-15/16 inch Jacquard pattern cards on 24 automat drums around the circumference of the machine. Each automat drum controls up to a maxi-

COMING IN MID-SEPTEMBER



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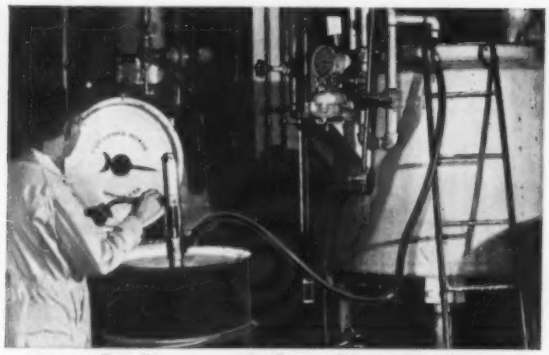

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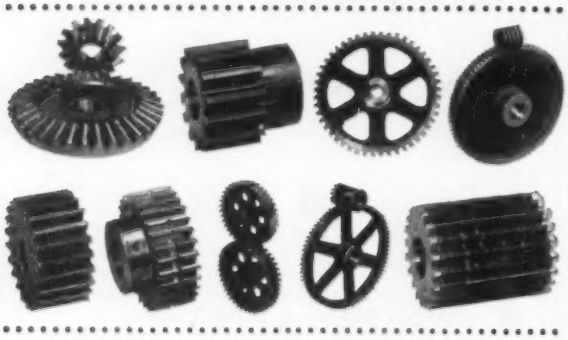

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mum of 56 pattern selection levers.

An automatic two-speed drive-side prevents undue machine shock from high-speed starts. A completely automatic lubrication system, for oiling the dial and cylinder needles and the main dial cap bearing, is standard equipment. Complete 12-volt stop motion systems are available in 48, 60 or 72 ends including needle knock-off and sentinal press-off detectors.

Wildman Jacquard Co., 1210 Stanbridge St., Norristown, Pa.

Do you want more data? Write ◂ or use card on page 193; list H-109

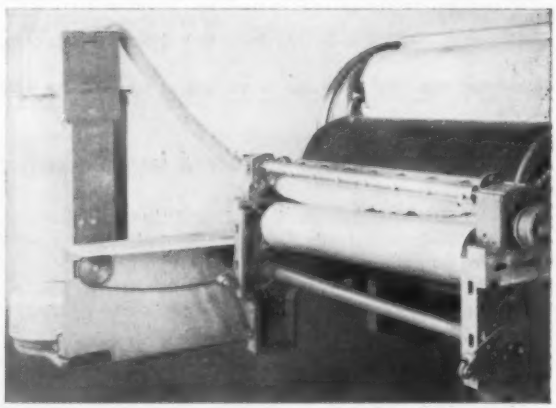
Aids use of unthrown yarn in seamless hosiery

A simple device, which may be applied to most seamless hosiery machines in a few minutes, materially improves the results obtained with unthrown yarn in the heel and toe. With it the flat yarn is tensioned by wrapping it around a simple cylindrical surface made from a piece of special plastic tubing. Thus, the yarn is not squeezed and parallelism of the fibers is not disturbed.

Fidelity Machine Co., Inc., 3908 Frankford Ave., Philadelphia 24, Pa.

Do you want more data? Write ◂ or use card on page 193; list H-110

Wool type card makes sliver for high pile knitting



A well controlled sliver for high pile knitting machines can be produced efficiently and economically with the new Davis & Furber Sliver Card, a 60" wide, two-cylinder machine specially designed for processing man-made fibers up to 3" long. Sliver is collected by a can coiler and deposited in a 20" x 42" can.

Advantages of using this card over converted woolen cards are: increased production, less space required, and reduction in downtime.

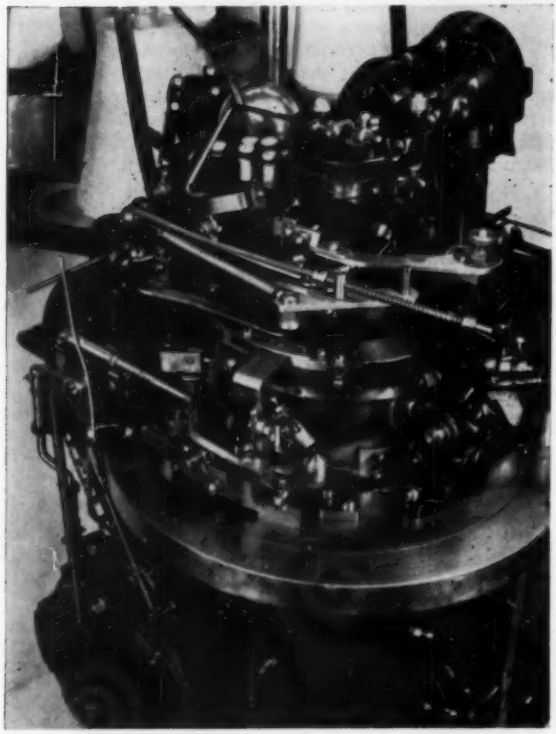
Equipped with metallic wire throughout, this card includes many features found on the Davis & Furber 84" woolen card. Each cylinder includes workers and strippers on a T-slot arch, plus other commonly used rolls. Waste and fly are well controlled. Variable speed controls can be supplied. A Bramwell G-4A Feeder is included.

Openings under the cast iron frame sections permit easy inspection and accessibility. Antifriction, self-aligning bearings and positive chain drive are other construction features.

Davis & Furber Machine Co., North Andover, Mass.

Do you want more data? Write ◂ or use card on page 193; list H-111

Adds another feed, makes stretch hose

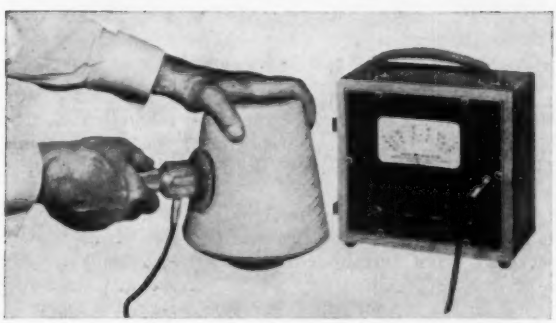


The Toone twin-knit attachment for seamless (ladies) machines may be attached to Scott & Williams B5 or K machines to convert them to twin-feed machines and to increase production by as much as 40 per cent. Also it permits the use of high-twist monofilament yarn with "S" twist at one feed and "Z" twist at the other. This is also ideally suited for manufacturing stretch stockings. If the gusset toe is not being made, the unit can be attached to Clarendon and Bentley machines type K.S.

Roy D. Faigenbaum, 7420 Mountain Ave., Melrose Park, Philadelphia 26, Pa.

Do you want more data? Write ◂ or use card on page 193; list H-112

Quickly gives moisture content of fibers and yarn



The Moisture Detector, Model RC-4, is ideally suited to the measurement of moisture content of natural and synthetic fibers in all forms—raw stock (loose or baled) and yarn on cones, tubes, skeins, etc. Completely dependable and readily portable, the battery-operated instrument will precisely check in less than one minute the moisture content of material in storage or in process without waste or loss of material.

Operation is easy. After initial standardization of meter to check batteries, electrode is applied to test material and meter read. Actual moisture content is obtained from the conversion table or can be read directly on the dial for a particular material. A line-operated model is also available.

Delmhorst Instrument Co., 658 Cedar St., Boonton, N. J.

Do you want more data? Write ◂ or use card on page 193; list H-113

Multi-purpose, high-production tenter

Any woven or warp-knit fabric of natural or synthetic fibers may be tentered, dried, or heat set on the Famatex high production single layer tenter which is only 5' 5" high to facilitate operation. Steam heated and gas-fired models are available.

The pin-clip tenter chain glides on strips of graphitized, self-lubricating material, so that soiled fabrics from this source are avoided and less power is required.

Even waves of the fabric selvages at high overfeed ratios are assured by an apparatus for overfeeding and shrinking which is operated with an endless cog rubber belt.

Hot air is blown into the fabric by nozzles from top and bottom over the entire width. Wide doors in each section of the housing permit easy inspection and maintenance. Screens filter out the fluff carried by the air stream. A top lifting device cuts the downtime for cleaning and maintenance to a minimum.

Robert Reiner, Inc., 550-564 Gregory Ave., Weehawken, N. J.

Do you want more data? Write ◂ or use card on page 193; list H-114

Cotton drawing frame has automatic draft control

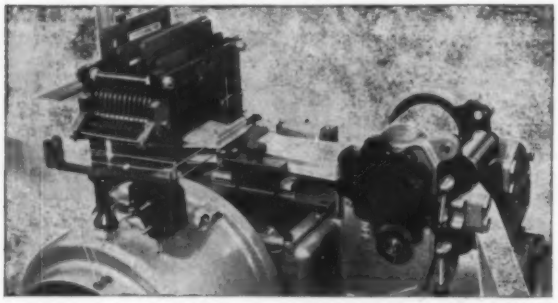
Commercial availability of the Saco-Lowell/Uster Versa-Matic ADC cotton system drawing frame, which automatically controls drafting by electronic means to compensate for variations in the weight of the sliver fed for delivery of a very uniform sliver, has been announced. The system is characterized by high accuracy, extremely short response time, and simplicity of operation. The short response time permits the control of all variations, even those of very short term, at delivery speeds up to 400 ft/min.

Advantages to be derived by using this new drawing frame in combed yarn mills are:

1. Only one drawing process is required; therefore less space is needed and there are savings in operation and maintenance.
2. Yarn quality is improved—more uniform yarn numbers, both within and between bobbins; yarn C.V. reduced 50% to 100%; higher breaking strength.
3. Fewer ends down in spinning, winding, warping, and weaving.
4. Substantial improvement in weaving and knitting operations and production of better fabrics.

Saco-Lowell Textile Machinery Division, Saco-Lowell Shops, Easley, S. C.

Do you want more data? Write ◂ or use card on page 193; list H-115



Efficient loom for wider, fancier narrow fabrics

The Mark VII "Weavematic" narrow fabric needle loom is designed for high production of wider and fancier fabrics. Patterns which repeat in 8, 6, or 5 picks and which require up to 12 harnesses for their construction may be made on this loom, with a range of 14 to 127 ppi.

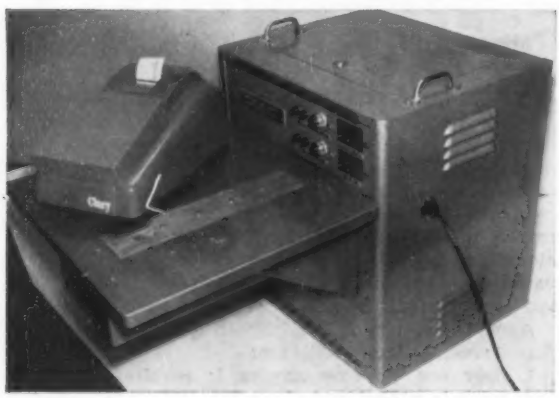
Two fabrics are woven simultaneously, using a reed of 3 5/16" maximum width at a speed of 1000 insertions per minute, or a total of 2,000 insertions (picks) per minute. Consequently, a fabric with 33 ppi can be produced at the rate of 100 yd/hr. By changing the filling inserter cam, fabrics requiring only a maximum reed width of ⅞" can be woven at 1,300 ppi.

Pattern changes may be easily and quickly made. Filling yarns are fed from large cones, magazine fashion. Looms accommodate extra large warps so that downtime for changing is minimized. Efficiency is generally above 92 per cent.

Bonas Bros. Looms, Inc., 151 W. 46th St., New York 36, N. Y.

Do you want more data? Write ◂ or use card on page 193; list H-116

Gives length of 100 wool staples in 3 minutes



A wool staple length recorder now commercially available provides rapid and highly accurate determinations of wool staple length with the values automatically printed out on a paper tape. Developed under contract with the Market Quality Research Division of the Agricultural Marketing Service, U. S. Dept. of Agriculture, the instrument will give in less than three minutes the individual staple length of 100 staples as well as the average staple length of the group.

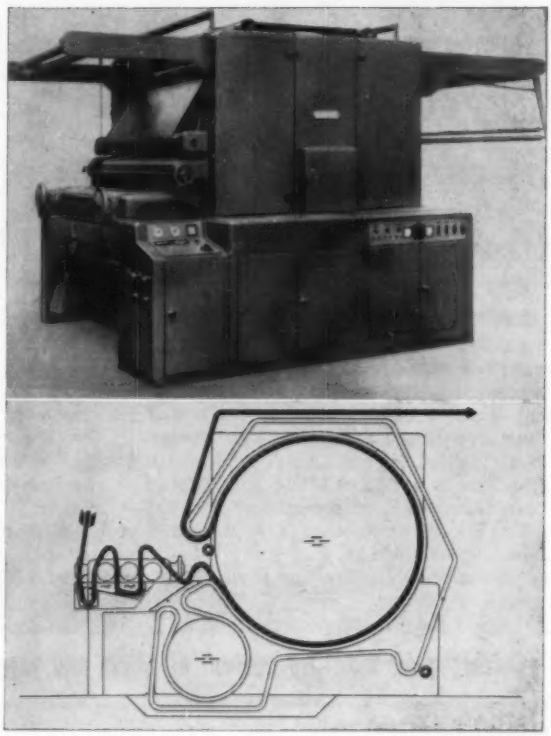
For laboratory or commercial operations where large quantities of length measurements are required, the machine can cut testing and recording costs to one-fourth of the manual costs. It measures the length of grease wool staples within a tenth of an inch. Samples from 0.2" to 9.9" in length are accommodated on the machine.

The wool staple is carried by a special "gripping" conveyor belt past a pin-point photoelectric beam. Interruption of the beam sends rapid pulses to a counter which stores the information until the staple is past the beam. The stored information is then printed out on paper tape and also displayed on a digital counter for quick visual monitoring. Another counter stores the cumulative inches of wool run through the machine.

United States Testing Co., Inc., 1415 Park Ave., Hoboken, N. J.

Do you want more data? Write ◂ or use card on page 193; list H-117

Continuous dyeing "reactor"



The Monforts reactor, embodying a continuous closed steam circuit, is compactly built as an integral unit consisting of pad, double jacketed cylinder, endless neoprene faced blanket and washing, drying and heating mechanism for the blanket.

The reactor principle involves continuous passage of fabric through a special entrance pad to a steam-heated jacketed drum surrounded by an endless blanket with a smooth neoprene surface which hermetically seals the fabric on the reactor drum. Moisture within the fabric is generated into a steam pressure atmosphere surrounding the fabric during its passage around the cylinder.

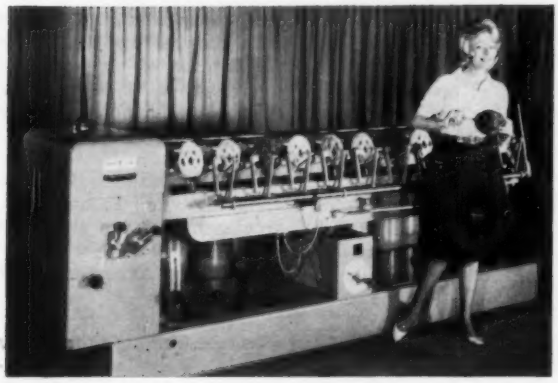
It has proved to be of exceptional value in continuous desizing in open width; vat print aging; two-stage vat printing processes; development of vat colors in continuous vat dyeing; application of naphthols and dyeing with

disperse dyestuffs on acetate and polyester fabrics.

A. Monforts Machine Works, 1411 Johnston Bldg., Charlotte, N. C.

Do you want more data? Write ◂ or use card on page 193; list H-118

Machine uniformly balls hand knitting yarns



With the new Croon & Lucke semi-automatic balling machine producers of hand knitting yarns may reduce labor costs, increase production, and obtain balls of yarn that look good and contain the same amount of yarn. Outstanding features of the 10-spindle balling machine are: (1) a yarn cutting device and holding mechanism which simultaneously cuts the yarn fed to all ten balls when full and holds the ends until an operative applies clips or labels and (2) an adjusting device for yarn thickness to assure yarns being wound one beneath the other.

Weight of all balls produced is the same, as the machine automatically stops when a predetermined yardage of yarn has been wound. Changing of gears to obtain various patterns and weights of balls is unnecessary; a simple lever adjustment is provided.

Cosa Corp., 405 Lexington Ave., New York 17, N. Y.

Do you want more data? Write ◂ or use card on page 193; list H-119

Prevents cooling water system corrosion

Hydrotrol is a type of water treatment feeder and controller designed especially for use with recirculating cooling water systems to prevent corrosion, mineral scale, slime, and algae. It eliminates drift of treatment and simplifies cooling water treatment control. "Bleed-off" and chemical feed are adjusted automatically so that the rate of chemical treatment feed and bleed-off are always in direct proportion to the rate of water evaporation or the cooling load on the system.

Other advantages include: a 95-per-cent savings in water analyses, control labor, and attention required; large savings in chemicals and water; usable with either acid or alkaline treatments; rugged, dependable; bears one-year guarantee after shipment against any defects of materials, workmanship, or operation; is low in cost for a complete system including feeder, controller, agitator, and chemical reservoir; and it can be added to existing chemical feed pump installations.

Heller Laboratories, Inc., 124 Fort Lee Rd., Leonia, N. J.

Do you want more data? Write ◂ or use card on page 193; list H-120

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H.J. THEILER CORPORATION
SPARTANBURG, S. C.

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Loepfe Bros., Ltd.	Optical Electronic Feeler
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THE LOEPFE OPTICAL ELECTRONIC FILLING FEELER

- No contact with the yarn — No feeler marks
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This Loepfe Feeler was shown in Atlantic City
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" C & K LOOM, C-7S and PAPA
" SAURER LOOM, Single shuttle Unifil
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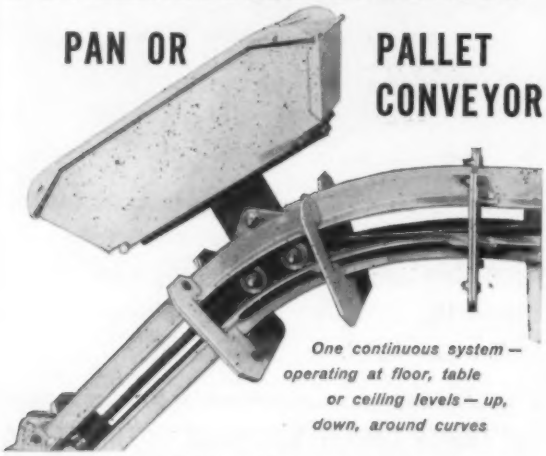
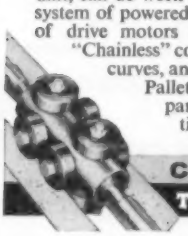
AMERICAN "Chainless"
PAN OR PALLET CONVEYOR



One continuous system — operating at floor, table or ceiling levels — up, down, around curves

One American "Chainless" Conveyor, with a single drive unit, can do work which otherwise requires a complicated system of powered belt or roller conveyors with a number of drive motors and transfer points. The continuous "Chainless" conveyor negotiates horizontal or vertical curves, and can be extended to almost any length. Pallet attachments can be used in place of pans. Eight-wheeled trolleys have exceptional stability. Write for Catalog CD-B.



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Books for textile mill personnel

Time Study Manual for the Textile Industry is a study, reference, and training aid for standards and methods men on the principles and practice of time study applications, with special consideration of problems of continuous processing and machine-operator cycles as encountered in textile mills. Prepared especially for the textile mill time study engineer and his assistant, the 216-page cloth-bound book should be of interest to management, technical, and supervisory personnel who wish to gain and benefit from a fuller knowledge of time study. Norbert L. Enrick, associate director of research and head of operations research division of the Institute of Textile Technology, edited the book which represents the practical knowledge and experience of 27 contributors who are members of the Southern Textile Methods and Standards Association, sponsors of the manual. Included are chapters on selling standards to top management, supervisors, and operatives; case histories of standards determinations, and a guide to statistical quality control. Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N. Y. Price, $6.50.

Especially suitable for use in mill training programs is *Cotton Ring Spinning* by Gilbert R. Merrill, a retired instructor of Lowell Technological Institute. The fifth in Professor Merrill's series of textbooks for students in the various technical schools and industry, this 174-page paper-bound book provides for the beginner "the basic devices of cotton ring spinning with enough detail to start him working along the generally accepted American spinning practices." The main portion of the text applies to conventional spinning frames which have been in use for many years. The last section contains a description of some of the newer frames. Text matter appears on only one side of the pages; diagrams appear on the other side, with the remainder of the space available for notes. Published by Gilbert R. Merrill, 364 Varnum Ave., Lowell, Mass. Price, $3.75.

A 32-page, pocket-size booklet entitled *Guidebook to Man-Made Textile Fibers, Textured Yarns and Dyeing Characteristics of Blended Fibers* contains an alphabetical list of over 200 world-wide trade-marks of man-made textile fibers and textured yarns in current use, together with the Federal Trade Commission generic category for each fiber which must be used on tags, in advertising, merchandising, and promotion of fibers, fabrics, and end products. A brief description of each fiber along with the producer's name are also given. The second section of the booklet groups all competitive trade-marked brands of man-made fibers within each generic category established by the FTC, plus a brief description of each fiber and the producer's name. Also included are an alphabetical listing of textured yarn trade-marks, descriptions, and sources and an alphabetical listing of the names of producers or sources, their addresses, and the trade-marks they own; hence, the cross-indexed listings make it possible to easily locate and identify a trade-mark by name, by generic class, or by producer. A 17" x 22" chart in the back-cover pocket of the booklet indicates the dyeing characteristics of blended fibers by generic classes and by leading specific trade-marked brands within the generic categories. The United Piece Dye Works offers the booklet and chart as a contribution to the industry. To defray costs of preparation and publication, a charge of $2.00 is made for a single copy of the booklet, including chart. Chart may be obtained separately, flat and laminated for wall use, or folded for desk use; single copies, each, $1.00.

Requests should be addressed to The United Piece Dye Works, 1410 Broadway, New York 18, N. Y.

An outstanding feature of the recently published Seventh Edition of *The Merck Index of Chemicals and Drugs* is a separate and greatly expanded cross-index section of more than 30,000 names of chemicals and drugs alphabetically arranged. This enables the user to locate a particular chemical description by page number regardless of whether he knows only the generic name, brand name, or systematic chemical name for a substance. The 1,600 pages of text also include nearly 10,000 descriptions of individual substances and more than 3,300 structural formulas. A special section lists more than 400 organic "Name" reactions with original and review references, together with a description and structural representation of each. There is an up-to-date periodic table arranged in accordance with the latest concepts of nuclear science, a table of international atomic weights, and close to 300 pages of appendices. Publications Dept., Merck & Co., Inc., Rahway, N. J. Price, $12.00.

How to Build Profits by Controlling Costs is written from the point-of-view of the small businessman. The first part of the booklet uses the case history approach to common business problems experienced by a typical small business owner. In the second part there is a step-by-step examination of record keeping, analysis of figures, and the use of ratios as a means of comparing performance. This section enables the reader to work out a way to examine and control the costs of his business. Dun & Bradstreet, Inc., Publications Division, P. O. Box 803, Church Street Station, New York 8, N. Y. Price: $1.00.

A special feature of the 1960 edition of *Fabric Facts*, a pocket-size 80-page booklet that defines in simple language the fibers, weaves, patterns, colors, finishes, etc., most commonly used in the field of textile apparel designing, buying, advertising, and selling, is the inclusion of the generic fiber names added by the Federal Trade Commission. Alphabetical listings contain trademark names of the manufactured fibers in use. Fiber trademark names are also grouped in the back of the booklet under the manufactured fibers' generic names assigned by FTC. Fairchild Publications, Inc., 7 East 12th St., New York 3, N. Y. Price: $1.00.

There is a detailed list of wasteful work rules and practices in the book, *Work Rules for Profit*. Fourteen chapters are devoted to discussions of such practical industrial problems as: "featherbedding"; wasteful work rules; waste elimination; changes in work rules and group controls of productivity; employee discipline and a penalty code; effective supervision and employee training; management prerogatives in union contracts; work schedules and arbitration together with recommended clauses. The book is documented with references to decisions of federal and state courts together with rulings of arbitrators on these issues. Labor Relations Institute, P. O. Box 306, Millington, N. J. Price, $5.00.

Part 10 of the *1959 Supplements to the 1958 Book of ASTM Standards* is now available and includes 40 standards for textile materials such as fibers, yarns, threads, fabrics, nonwoven fabrics, asbestos textiles; cotton, man-made fiber, and wool textiles; soaps, water, and wax polishes. With this 394-page supplement which contains new standards and revisions adopted in 1959, textile industry personnel may bring standards books up-to-date. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. Price, $4.00.

Moisture in Textiles is primarily concerned with the relationship between the content of moisture in a fiber and that in the atmosphere, and with effects (such as heat changes) which occur during the sorption process. Edited by J. W. S. Hearle and Prof. R. H. Peters of the Manchester (England) College of Science and Technology, the 204-page, cloth-bound book should prove helpful to research personnel in studying the theoretical aspects of moisture in fibers and to the textile technologist in the mill concerned with production problems. Published jointly by The Textile Institute and The Textile Book Publishers Inc., a division of Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N. Y. Price, $6.50.

The newer techniques of determining by experimental methods the structure and physical properties of textiles are emphasized in *Physical Methods of Investigating Textiles*, a 412-page book edited by R. Meredith of the Department of Textile Technology at Royal College of Science and Technology in Glasgow, Scotland, and J. W. S. Hearle of the Department of Textile Industries, Manchester (England) College of Science and Technology. Among subjects covered in the 14 chapters are: X-ray techniques, infrared spectroscopy, electron microscopy, optical microscopy; mechanical properties of fibers, yarns, and fabrics; and applications of nuclear physics. Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N. Y. Price, $13.00.

Volume 10 of the *Review of Textile Progress* is a concise guide to the research achievements of the year 1958, as well as the developments and techniques reported by the textile industry during that period. Material is classified as follows: Physics and Chemistry of Fibrous Materials; Fiber Production; Conversion of Fibers into Finished Yarns; Fabric Production; Coloring Matters; Coloring of Textiles; Finishing of Textile Fabrics; Analysis, Testing, Grading, and Defects; Laundering and Drycleaning; Building and Engineering; Industrial Applications of Textiles. Butterworths Scientific Publications, 4 & 5 Bell Yard, London, W. C. 2, England. Price, $7.00.

Textile Engineering Processes deals with: (1) the properties of fibers, yarns, and fabrics; (2) machinery used in processing; and (3) interaction between textile materials and the atmosphere. This 366-page, cloth-bound book was intended to serve as a text for British students of other fields who wish to qualify as textile engineers either by passing university examinations on the subject or through examinations for associate membership of the Institute of Mechanical Engineers. Each chapter was prepared by experts in the field, and the book was edited by Dr. A. H. Nissan who is research professor of the department of chemical engineering at Rensselaer Polytechnic Institute, Troy, N. Y. Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N. Y. Price, $9.25.

Textile industry personnel who read French may review the latest scientific developments of the wool industry in *Aspects Scientifiques de l'Industrie Lainiere* (Scientific Aspects of the Wool Industry), by F. Monfort who is secretary of the technical committee of the International Federation of the Wool Industry. The author has observed the development of research work on wool and has assembled the results of a number of studies in one volume of 514 pages. Each of the 12 chapters is followed by an extensive bibliography. Published by: Dunod, 92 Rue Bonaparte, Paris 6, France. Price: $17.50.

FREE BOOKLETS

8-1 TACHOGRAPH SYSTEM. Booklet tells how systems can be profitably used in applications where speed, time, or measurement control is essential to quality. Wagner Electric Corp., 6400 Plymouth Avenue, St. Louis 33, Missouri.

8-2 AUTOMATIC SPOOLERS. Brochure describes operating principles and advantages of using automatic spoolers to increase automation in this part of textile manufacturing. Barber-Colman Company, Rockford, Illinois.

8-3 DYEING POLYACRYLONITRILE. Booklet describes use of uniperol and in the dyeing of polyacrylonitrile fibers with basic dyestuff. Putnam Chemical Corp., Beacon, New York.

8-4 PARMATIC SPEED VARIATOR. Booklet describes new parmatic speed variator, a compact packaged adjustable speed d-c motor operating from a-c power. Request bulletin GEA-7012, General Electric Company, Schenectady 5, New York.

8-5 PACEMAKER TWISTER. Brochure describes many unique features which provide maximum twisting efficiency and lowest possible cost. Whitin Machine Works, Whitinsville, Mass.

8-6 DACRON/COTTON YARNS. 18-page booklet entitled "Processing Blends of 'Dacron' Polyester Staple and Cotton" tells how to make yarns of 65% dacron stable and 35% cotton. Bulletin D-119. Textile Fibers Dept., E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del.

8-7 KENNETT PRODUCTS. Folder describes various boxes, cans, and trucks available for textiles. National Vulcanized Fibre Co., Wilmington 99, Delaware.

8-8 "ROVEMATIC" FRAME. Brochure describes unique features of new "Rovematic" Frame, including drawings and draft chart. Saco-Lowell Shops, Textile Machinery Division, Easley, S. C.

8-9 SULFATED OILS. Booklet gives details on Nopcosulf Series of sulfated oils, which are true oils but dispersible in water. Nopco Chemical Company, 60 Park Place, Newark, New Jersey.

8-10 "TAILORED TORQUE". Brochure explains operating principle and outlines specific operating advantages of several clutch, brake and clutchbreak applications. Warner Electric Break & Clutch Company, Beloit, Wisconsin.

8-11 MICRO-PROCESSING. Booklet gives details on precision-built units for removing solid, liquid or vapor contaminants from fluid systems. Selas Corp. of America, Dresher, Penn.

8-12 OPENER BLENDER CLEANER. Booklet describes the Saco-Lowell/Davidson-Kennedy Opener-Blender-Cleaner. Gives efficiency and production figures. Saco-Lowell Textile Machinery Division, Easley, South Carolina.

8-13 AUTO DOFFER. Booklet describes completely automatic doffing machine for use on spinning or twisting frames. Edward S. Rudnick, Olympia Bldg., P. O. Box 244, New Bedford, Mass.

8-14 FINANCIAL OUTLOOK FOR TEXTILES. Booklet discusses the economic, technological, financial and marketing outlook for the textile industry. Werner Textile Consultants, 1430 Broadway, New York 18, New York.

8-15 STEAM TRAPS. Catalog provides detail information on complete line of low cost bi-metal thermostatic and float thermostatic steam traps. MIL Division, Farris Engineering Corp., 547 Commercial Avenue, Palisades Park, New Jersey.

8-16 TUBE DRIVE TWISTER. Booklet describes how larger shipping packages of glass yarn may be produced on tube drive twister. Leesona Corp., P. O. Box 1605, Providence 1, R. I.

8-17 COMPUTERESE. 22-page glossary helps to make computer language more intelligible to the layman. Minneapolis-Honeywell Regulator Company, Wayne and Windrim Avenues, Philadelphia 44, Pa.

8-18 PROPANE AIR MIXERS. Booklet describes safe, simple, automatic, accurate, dependable propane air mixers and plants for peak shaving or complete stand-by. Applied Engineering Company, Orangeburg, S. C.

8-19 FMC CHEMICALS. Brochure lists FMC chemicals alphabetically, with physical data and uses, including the major use areas. Food Machinery and Chemical Corp., 161 East 42nd Street, New York 17, New York.

8-20 BRUSH CATALOG. Catalog of brushes for industry offers engineering information on construction and application. M. W. Jenkins' Sons, Inc., 444 Pompton Avenue, Cedar Grove, Essex County, New Jersey.

8-21 WATER PROBLEMS. Booklet discusses the whole range of industrial water problems and highlights the necessity for proper water management. Hagan Chemicals & Controls, Inc., Hagan Center, Pittsburgh 30, Pa.

BOOKLETS

raw stock to roving

T-101 **LUMMUS PEPPER - SHAKER OPENER.** Gives complete details and photographs. Aldrich Machine Works, P. O. Box 750, Atlanta, Ga.

T-102 **STATIC ELIMINATION.** How to eliminate static safely and inexpensively. Simco Co., 920 Walnut St., Lansdale, Pa.

T-103 **CARD GRINDING INFORMATION.** Care and operation of cards. B. S. Roy & Son Co., Worcester, Mass.

T-105 **VERSA - MATIC DRAWING FRAME.** Describes drafting elements, quality of sliver, roving and yarn possible. Saco-Lowell Shops, 60 Batterymarch St., Boston, Mass.

T-106 **SARGENT OPENER.** Describes opener with rotary evener and stripper. C. G. Sargent's Sons Corp., Graniteville, Mass.

T-107 **FEATHERTOUCH DRAFTING.** How to get "highest production per frame at lowest cost." Ideal Industries, Inc., Bessemer City, N. C.

T-111 **MAGNETIC IDEAS.** Booklet shows uses of permanent magnetic separation equipment in opening room as well as throughout mill. Removes tramp iron, prevents fires. Eriez Mfg. Co., Erie, Pa.

T-112 **ADVANTAGES OF ALDRICH PICKERS.** Good technical text, comprehensive pictures. Aldrich Machine Works, P. O. Box 750, Atlanta, Ga.

T-113 **NEW CONDENSER TAPE.** Describes Supr-O-Tape, an impregnated fabric condenser tape. Benjamin Booth Co., Allegheny Ave. & Janney St., Philadelphia 34, Pa.

T-119 **FIBER METER.** Automatic weighing and blending assures quality, holds variation to 1%. James Hunter, Inc., P. O. Box 298, Mauldin, S. C.

T-120 **PIN DRAFTERS.** Textile job report No. 21 tells how Warner & Swasey Pin Drafters help modify jute systems for carpet yarns. Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, Ohio.

T-121 **UNIVERSAL CARD COILER.** Literature describes both head and base swivel for adjustment. Includes data on 90-day free trial. McDonough Power Equipment, Inc., McDonough, Ga.

T-122 **RECONDITION OPENING & CLEANING.** Bulletin gives whys and wherefores of reconditioning your opening and cleaning lines. Special attention given to each machine with suggestions as to parts replacement. Saco-Lowell Shops, 60 Batterymarch St., Boston 10, Mass.

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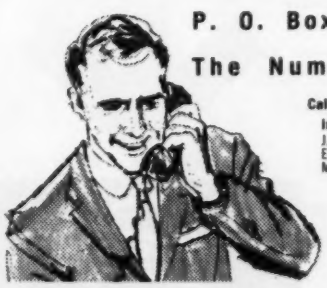

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BOOKLETS

T-508 PEROXIDE BLEACHING SYSTEM. Illustrates and describes this continuous system. E. I. du Pont de Nemours & Co., Electrochemical Dept., Wilmington, Del.

T-510 TEXTILE CHEMICALS. Describes leading products for wet processors. Royce Chemical Co., Carlton Hill, N. J.

T-512 DEPUMA. Describes odorless, viscous, non-evaporating emulsion for anti-foam. Koppers Co., Inc., Chemicals & Dyestuffs Div., Porter Bldg., Pittsburgh 19, Pa.

T-513 CATALYST AC-6. Tells how curing efficiency may be stepped up as much as 25%. Monsanto Chemical Co., Plastic Division, Springfield 2, Mass.

T-514 SODA ASH BULLETIN. Contains useful data covering this subject. Solvay Sales Division Allied Chemical Corp., 40 Rector St., New York 6, New York.

T-516 ALUMINUM CHELATE PEA-1. Technical data sheet tells how aluminum Chelate PEA-1 may be used with advantage in many applications where aluminum is proplate is unsatisfactory. Harshaw Chemical Co., 1945 East 97th St., Cleveland 6, Ohio.

T-517 CHEMICAL CATALOG. Lists products with chemical composition, properties and applications. Antara Chemicals Div., General Aniline & Film Corp., 435 Hudson St., New York 14, New York.

T-519 HYDRAULIC POWER UNITS. Describes unit for operating hydraulic textile machines. B. F. Perkins & Son, Inc., Holyoke, Mass.

T-522 CUT WATER TREATMENT COSTS. Describes the control of scale, slime, algae and corrosion. Oakite Products, Inc., 126C Rector St., New York 6, New York.

T-526 PRODUCTS FOR TEXTILE IMPROVEMENT. Describes products and services designed to provide better fabrics. B. F. Goodrich Chemical Co., 3135 Euclid Ave., Cleveland 15, Ohio.

T-527 SODIUM HYDROSULFITE. Literature and test samples are available on "T-C Hydro." Tennessee Corp., 617-629 Grant Bldg., Atlanta, Ga.

T-528 ETHANOLAMINES. Lists application, chemical and physical properties. Nitrogen Division, Allied Chemical Corp., 40 Rector St., New York 6, New York.

T-531 ROTARY DYEING MACHINE For use in dyeing hosiery, hats, gloves, socks, etc. Turbo Machine Co., Lansdale, Pa.

T-534 DYEING AND FINISHING MACHINERY. Complete line presented in series of catalogs. Birch Brothers, Inc., 32 Kent St., Somerville 43, Mass.

T-535 DYEING, BLEACHING AND DRYING EQUIPMENT. Complete line for cotton, wool and synthetics described. Color pictures. Morton Machine Works, 1718 3rd Ave., Columbus, Ga.

T-536 NAPTHOL RATIOS SLIDE CHART. Quickly and accurately enables operators to determine Napthol Ratios. Alliance Color & Chemical Co., 33 Ave. P, Newark 5, New Jersey.

T-540 PENFORD FINISHING GUMS. Complete data, including physical properties. Penick & Ford Ltd., Inc., 750 Third Ave., New York 17, New York.

T-541 REGENERATION OF ZEOLITE WATER SOFTENERS. Explains advantages of Lixate Process. International Salt Co., Scranton, Pennsylvania.

T-542 DYEING SYNTHETIC FIBERS. Detailed analysis of methods and materials. General Dyestuff Co., 435 Hudson St., New York 14, New York.

T-543 INDUSTRIAL BRUSHES. Features use on shears, printing machines. M. W. Jenkins' Sons, Inc., 444 Pompton Ave., Cedar Grove, N. J.

T-544 WASTE HEAT RECOVERY. Describes system of waste heat recovery from polluted water. Ludell Mfg. Company, 5200 West State Street, Milwaukee, Wis.

T-545 WASHERS FOR SCOURING, BLEACHING, ACIDIFYING. Describes high capacity, continuous process washers. C. G. Sargent's Sons Corp., Graniteville, Mass.

T-546 NAPHTHOL FOR LIGHTFAST BROWNS. Booklet describes new, straight, non-substantive naphthol. Naphthol As-BN, for the continuous naphtholation of cotton and rayon piece goods in the dyeing of economical, fast-to-light browns. General Dyestuff Co., 435 Hudson St., New York 14, New York.

T-547 SOFTENER LUBRICANT, NAPPING AID. Technical information available on softener, lubricant and napping aid for natural and synthetic fibers, yarns and fabrics. Nopco Chemical Co., Harrison, N. J.

T-548 HANDBOOK ON METHOCEL. Gives technical information and use data on family of methylecellulose ethers called Methocel. Organic Chemicals Sales, The Dow Chemical Co., Midland, Mich.

T-550 POLYVINYL ACETATE EMULSION. Bulletin contains a description of Celanese emulsions and cites advantages of Celanese polyvinyl acetate emulsions in textile finishing. Celanese Chemical Co., 180 Madison Ave., New York 16, N. Y.

T-554 INSTRUMENT CATALOG. Complete information on industrial instrument accessories and supplies. Includes specifications, parts numbers and prices. Catalog 500, Foxboro Co., Foxboro, Mass.

T-556 HUNTER DYEING EQUIPMENT. Describes fully with diagrams Hunter Model A Dye Becks, Hunter No/Lap Reels, Model S Dye Kettles, Open Width Dye Kettles, Sample Dye Kettles. James Hunter Machine Co., North Adams, Mass.

T-557 HIGH ACTIVITY CATALYST. Technical bulletin describes new catalyst AC-6 which provides increased activity, excellent bath life, minimum odor formation, etc. Monsanto Chemical Co., Plastics Div., Springfield, Mass.

T-558 CATIONIC DYE LEVELER. Bulletin TX-34 gives new information on dye leveler for acid colors on nylon tricot and wool through use of Nopco 1425-B. Nopco Chemical Co., Textile Chemicals Div., Harrison, N. J.

T-559 FLOW CONTROL Complete information on largest selection of values to handle flow control requirements. William Powell Co., 2525 Spring Grove Ave., Cincinnati 22, Ohio.

T-561 PUMP POURABLE PASTES. Bulletin tells how Moyno pumps can pump any textile liquid that can be forced through a pipe, even if highly viscous or corrosive. Robbins & Myers, Inc., Springfield, Ohio.

T-563 POLYETHYLENE FINISHING AGENT. Booklet contains information needed to adopt Emulsifiable A-C polyethylene as a finishing agent to any particular process. Semet-Solvay Petrochemical Div., Allied Chemical Corp., 5th Floor T, Rector Street, New York 6, N. Y.

T-564 HYDROGEN PEROXIDE BLEACHING. Booklet discusses advantages, operating details and savings in chemical costs of Activated Hydrogen Peroxide Bleaching Process for Cotton Solvay Process Div., Allied Chemical Corp., 61 Broadway, New York 6, N. Y.

T-566 ETHYLEX GUMS. Brochure describes properties of hydroxy ethyl ether derivatives of corn starch. Applications of these noncongealing gums in warp sizing and finishing covered. A. E. Staley Mfg. Co., Box 151 Decatur, Ill.

T-570 CARPET DRYERS. Details, pictures, drawings on driven roll, conveyor, and tenter types. Andrews and Goodrich Div., 336 Adams St., Boston Dorchester, Mass.

T-572 DYEING MACHINERY FOR EVERY PURPOSE. Illustrated literature available on complete line of automatically controlled machinery. Gaston County Dyeing Machine Co., Stanley, N. C.

T-576 YARN PREPARATION. Describes products for yarn preparation, printing, finishing. Polymer Industries, Springdale, Conn.

T-577 STAINLESS DRY CANS. Information on stainless steel, 75 psi, reverse dished, head dry cans. Can be furnished Teflon-coated if desired. Sims Metal Works, West Point, Ga.

T-579 AUTOMATIC GUIDING EQUIPMENT. Catalog shows various types of automatic guiding equipment for accurate cloth guiding. Fife Mfg. Co., Inc., P. O. Box 9815, Oklahoma City, Okla.

fibers and yarns

T-601 FORTISAN-36, NEW TEXTILE FIBER. Includes charts, diagrams, text, presents technical properties. Textile Sales Dept., Celanese Corp. of America, P. O. Box 1414, Charlotte, N. C.

T-602 CAPROLAN NYLON HEAVY YARNS. Describes strength, long flex life and ready dyeability. Fiber Sales Dept., National Aniline Div., 261 Madison Ave., New York 16, N. Y.

T-603 RAYON—MILE BY MILE. Details on how rayon is produced mile by mile, perfect inch by inch. Industrial Rayon Corp., 500 Fifth Avenue, New York 18, N. Y.

T-604 THE CHEMSTRAND NYLON Story. Describes the birth and growth of Chemstrand Nylon. Chemstrand Corp., 350 Fifth Ave., New York 1, N. Y.

T-605 COLOR-FAST FIBERS. Further information on "Coloray," Courtauld's solution dyed rayon staple which is a contribution to color fastness in fabrics. Courtaulds (Alabama) Inc., 600 Fifth Ave., New York 20, N. Y.

T-606 "DIAL-A-FIBER" Ingenious circular chart indicates properties and compatabilities of "Uvitex" for application on natural and synthetic fibers. Ciba Co., Inc., Route 208, Fair Lawn, New Jersey.

T-608 TASLAN TEXTURED YARNS. Technical information on dyeing and finishing of new fabrics made with Taslan. E. I. du Pont de Nemours & Co., Wilmington 98, Delaware.

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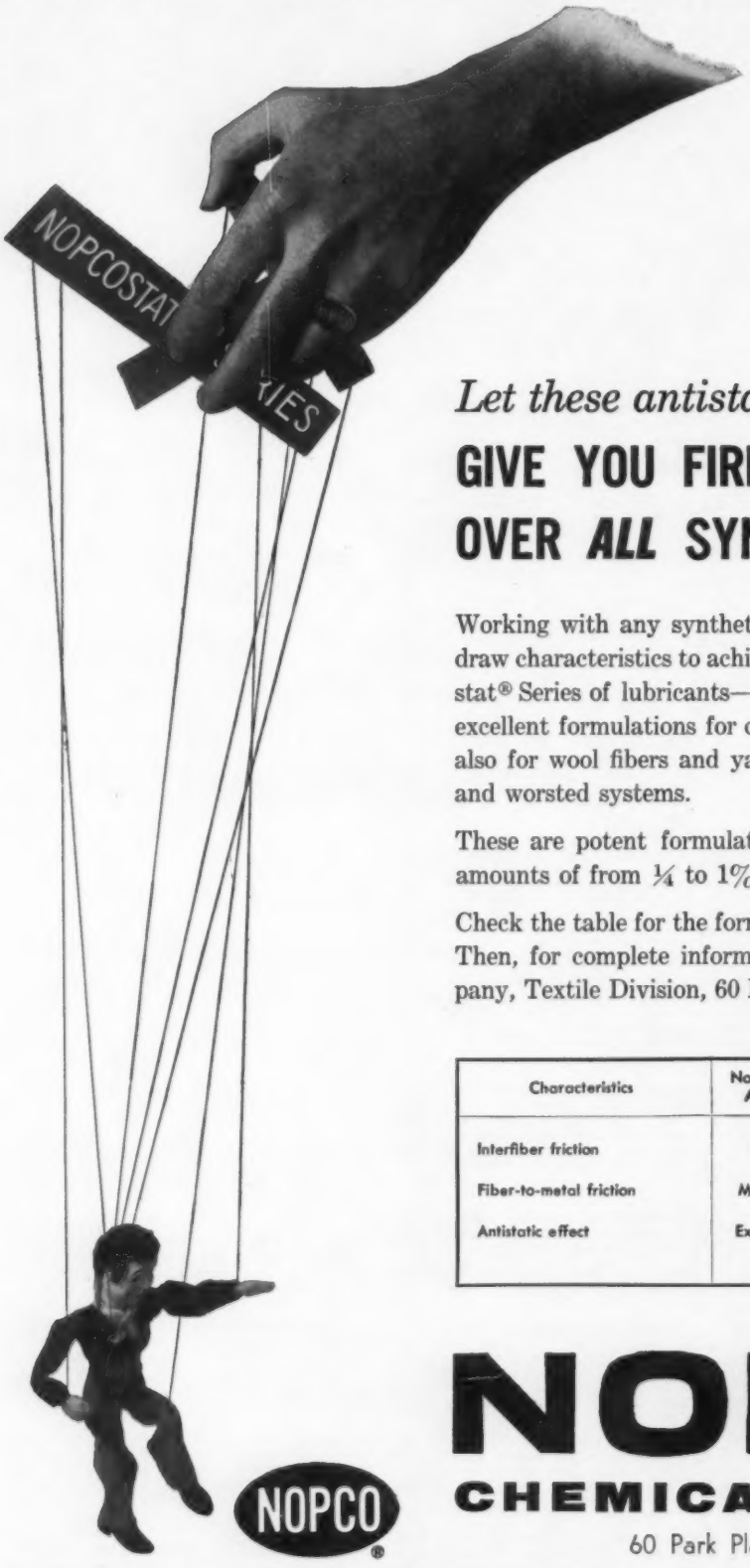

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BOOKLETS

T-609 PROCESSING NYLON STAPLE. Data sheet describes method of processing Du Pont 42 Nylon Staple in blends with cotton. Covers complete operation through sizing. Bulletin N-93, E. I. du Pont de Nemours & Co., Inc. Wilmington, Del.

laboratory

T-701 TESTING INSTRUMENTS. Descriptions of 37 instruments for testing textiles. Custom Scientific Instruments, Inc., 541 Devon St., Kearny, N. J.

T-703 SHADOGRAPH WEIGHING DEVICES. Pictures and information on various types of scales. Exact Weight Scale Co., Columbus 8, Ohio.

T-705 STROBOTAC. Measures speed of rotating, reciprocating or other cyclic motions. General Radio Co., West Concord, Mass.

T-706 YARN COUNT SCALE. Data sheet tells how direct-reading instrument provides fast, accurate method of determining yarn number. Exact Weight Scale Co., Columbus 8, Ohio.

T-712 AUTOMATIC MOISTURE CONTROL. Booklet tells how Hunter Electro-Psychrometers are used in measuring percentage of moisture in all classes of textiles, whether yarns or fabrics. Hunter Controls, Inc., Div., James Hunter Machine Co., North Adams, Mass.

services for management

T-801 FACTORING SERVICE. Details on advantages of factoring, including information on general banking and pension plans. Trust Company of Georgia, Atlanta, Ga.

T-802 NON-WOVEN FABRICS. Report includes how non-woven fabrics are made, machinery involved, sample fabrics. Textile Fibers Dept., E. J. du-Pont de Nemours & Co., Inc., Wilmington 98, Del.

T-805 PROFIT THROUGH FACTORING. Brochure gives facts on the use of factoring as a modern plan for developing sound business growth and added profits. Walter E. Heller & Co., Dept. TI-2, 105 W. Adams St., Chicago 90, Ill.

T-807 GROUP INSURANCE. Information on how textile group insurance can insure the happiness of your employees and make for a better running mill. Provident Life and Accident Insurance Co., Group Dept., Chattanooga, Tenn.

T-808 FACTORING. Complete details on services offered as mill factors. L. F. Dommerich, 271 Madison Ave., New York, N. Y.

T-810 THE WONALANCET WAY is the title of an editorial booklet published five times a year dealing with current problems. Write Wonalancet Company, 128 Burke St., Nashua, N. H.

T-812 BEECHCRAFTS FOR 1960. Booklet available from Southern Airways Company shows how Beechcraft executive airplanes can save executives time and money. Write Southern Airways Co., P. O. Box 718, Atlanta, Ga.

T-819 ORGANIZED LUBRICATION PAYS. Planning book entitled "Management Practices that Control Costs via Organized Lubrication" shows how to effect savings in five areas of plant operation. Available from Texaco, Inc., 135 E. 42nd St., New York 17, N. Y.

T-821 INVENTORY CONTROL. How a daily report of inventory condition mechanically producted on existing business machines showed a net direct payroll saving of more than 10,000 a year. Administrative Methods Dept., Werner Textile Consultants, 1430 Broadway, New York, N. Y.

plant operation

T-902 BELT LACING EQUIPMENT. Includes prices, specifications, etc. Clipper Belt Lacer Co., Grand Rapids, Michigan.

T-903 "MOTOR SELECTOR." How to select a-c motors for specific application. Bulletin B-2103. Reliance Electric & Engineering Co., 24701 Euclid Ave., Cleveland 17, Ohio.

T-904 GEARMOTORS, MOTORGEARS, AND FLUID DRIVES. Catalog supplies complete information on double, triple, and quardruple reduction gearmotors and motorgears. Electrofluid and fluid drives are also explained. Link-Belt Company, Dept. PR, Prudential Plaza, Chicago 1, Illinois.

T-907 WRAP UP LINT PROBLEMS. Automatic lint filter removes lint from air, winds it into disposable roll. Bulletin 234, American Air Filter Co., 275 Central Ave., Louisville 8, Ky.

T-908 TEXTILE MOTORS. Bulletin describes compete line of textile motors. Diehl Mfg. Co., Finderne Plant, Somerville, N. J.

T-909 COMPRESSORS. WB two-stage water-cooled. Space-saving units require modest foundation up to 125 psi and 1150 cfm displacement. Bulletin WB-10. Gardner-Denver Company, Quincy, Illinois.

T-910 MODERN LUBRICATION METHODS. A report to management tells how modern lubrication methods can help save thousands of dollars in three major economic areas of textile plant management. Describes twelve operating advantages of automatic lubrication systems. Lincoln Engineering Co., 4010 Goodfellow Blvd., St. Louis 20, Mo.

T-911 LEATHER BELTING. Selection, installation, proper maintenance. Atlanta Belting Co., 508-510 Whitehall St., S. W., Atlanta, Ga.

T-912 STORY OF NYLON BRISTLE. Tells of discovery and production, with special attention to "Tynex," a form of nylon ideal for use in brushes. M. W. Jenkins' Sons, Inc., 444 Pompton Ave., Cedar Grove, N. J.

T-913 "ONE-SHOT" LUBRICATORS. Bulletin describes wide field of application for one-shot lubricators on machines requiring closely controlled but infrequent oil feed. Bijur Lubricating Corporation, Rochelle Park, N. J.

T-914 INDUSTRIAL GREASES. Describes multi-purpose lithium soap industrial greases. Sinclair Refining Co., 600 Fifth Ave., New York, New York.

T-917 BLOWERS AND EXHAUSTERS. Full description, including detailed drawings. Buffalo Forge Co., 490 Broadway, Buffalo 5, N. Y.

T-918 PAINT STRIPPING BOOKLET. Explains simplified method of stripping paint. Oakite Products, Inc., 22 Thames St., New York 6, New York.

T-921 CATALOG OF NEEDLE BEARINGS. Design, application for five types of needle bearings. The Torrington Co., Torrington, Conn.

T-924 BALL BEARINGS FOR TEXTILE MACHINERY. Bearings for all phases of textile processing. The Fafnir Bearing Co., New Britain, Conn.

T-925 LUBRICATION OF BEARINGS. Helpful list of do's and don't to prolong bearing life. New York & New Jersey Lubricant Co., 292 Madison Ave., New York 17, New York.

T-931 NEW V-BELT DRIVES. Bulletin contains information on selection and operation of V-belt drives. Covers all types of V-belt drives. Dodge Mfg. Corp., Mishawaka, Ind.

T-932 SMOOTH ACCELERATION, DECELERATION. Describes eddy-current equipment for smooth, stepless acceleration and deceleration. Eaton Mfg. Co., 3307 14th Ave., Kenosha, Wis.

T-933 CATECHISM OF ELECTRIC MACHINERY. Booklet contains complete technical treatise on various electrical machines. Electrical terms defined. Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Illinois.

T-937 V-BELTS. Tells how raw materials and finished belts are tested and inspected. Quality control and experimental production covered. Booklet 5-51107, Dept. 794, Goodyear Tire & Rubber Co., Akron 16, Ohio.

T-938 EMERGENCY CHEMICAL CLEANING—Booklet tells how rust, scale and other deposits may be removed from heat exchange equipment, regardless of intricacy. Anderson Chemical Co., Inc., Box 1424, Macon, Georgia.

T-939 BOILER FEEDWATER TREATMENT. Bulletin describes BRAXON & FLAKO internal automatic boiler feedwater treatment and services of trained service engineers in eliminating the problems of scales, sludge, corrosion, etc. Anderson Chemical Co., Inc., P. O. Box 1424, Macon, Ga.

materials handling

T-1005 TRAMRAIL ENGINEERING AND APPLICATION. Data on how Tramrail equipment can cut handling costs. Cleveland Tramrail Div., Cleveland Crane and Engineering Co., 1036 East 289th St., Wickliffe, Ohio.

T-1007 MATERIALS HANDLING FOR TEXTILES. Shows how fibre trucks can increase efficiency, protect products. National Vulcanized Fibre Co., Wilmington 99, Del.

T-1013 TRUCKS DOFF, STORE, BECOME SPOOLER TRAY. Brochure tells how mobile boxes are being used as doff boxes, storage boxes, and spooler trays on Barber-Colman spooler. Fisher Mfg. Co., Hartwell, Ga.

T-1014 CARPET CORES, STORAGE TUBES. Literature on simplified storage and better cores for rugs. Sonoco Products Co., Hartsville, S. C.

T-1015 OVERHEAD CONVEYOR. Catalog features "Cable-Way" Overhead Conveyor which has low-cost, ease of installation, quiet operation and long life. Conveyor Division, The American MonoRail Co., Fourth and Franklin Sts., Tipp City, Ohio.

T-1016 GUIDE TO BETTER CLOSURES. For use as a guide for the evaluation of methods currently in use to effect economy and better production in the closure of fiber board boxes. Acme Steel Products Div., Acme Steel Co., 135th and Perry Ave., Chicago, Ill.

T-1020 AUTOMATIC WRAPPING. Tells how automatic packaging increases the sales appeal of textile products. Saves labor and materials and adds tamper-proof product protection. Write Hayssen Mfg. Co., Sheboygan, Wis.

T-1021 TUBES, BOBBINS, PIRNS. Information on world renowned yarn carriers, reliable as to stability, dimensions, weight. Emil Adolff (U. S. A. agents: Textube Corp., 695 Summer St., Stamford, Conn.).

T-1022 STRONG CORES. Data on lightweight, quality tubes and cores for textiles. Star Paper Tube, Inc., Rock Hill, S. C.

T-1023 MATERIALS HANDLING. Describes lightweight, durable, smooth products. Spaulding Fibre Co., Inc., Dover, New Hampshire.

T-1024 CONDITIONING TRUCK. Details on all-aluminum, nonrusting conditioning truck. Excel, Inc., Lincolnton, N. C.

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FLOORS....

TIME .....

EQUIPMENT.

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36 NORTH CLINTON ST., CHICAGO 6, ILL.
1000 PEACHTREE N. E., ATLANTA, GA.

PERSONAL NOTES

(from page 32)

Charleston, S. C. plant, has been named executive vice-president and elected to the board of directors of United Piece Dye Works. **Russell DeWitte** has been elected vice-president and has taken charge of the York, Pa., plant.

John M. Caughman, Sr., superintendent of Spartan Mills, Spartanburg, S. C., was recently awarded the honorary degree of Doctor of Commercial Science from Newberry (S. C.) College.

Dr. George S. Wham has joined the Phillips-Van Heusen Corp. as director of research, testing, and product development.

Arthur B. Lauman, manager of the Albany, Ga., plant of A. & M. Karagheusian, Inc., has been transferred to the New York office as eastern divisional sales manager. **James C. Barbre,** formerly assistant plant manager, has been named to succeed Mr. Lauman.

Dr. Edwin L. Lotz has accepted the newly created position of vice-president in charge of research and development for Hess, Goldsmith & Co., Inc.

Top company officials and key mill operating executives joined the entire research staff at a testimonial dinner held in honor of **Howard D. Corkum,** director of research for The American Thread Co., Inc., on the eve of his retirement. Mr. Corkum will continue to serve on a consultant basis. **David H. Fields** has been named to succeed Mr. Corkum. * * * **George W. Leopold** has joined the firm as data processing manager.

William E. Cruickshank has been promoted to plant manager and **Ralph Stott** has been named plant superintendent of the Westerly, R. I., plant of Bradford Dyeing Association, U. S. A.

Paul Cockman, former assistant overseer of the warp-spinning department at the White Oak plant, has been promoted to the industrial engineering staff of Cone Mills Corp. * * * **Harold L. Haney** has been named assistant overseer in the spooling department of the White Oak plant. **Walter L. Caviness** has been transferred to the quality control department. **Bryson Dickerson** has been promoted to general overseer of the spinning department. **William J. Rumley,** formerly head loom fixer on the second shift, has been named assistant overseer in the weaving department and loom fixer instructor. **Paul Wyrick, Jr.,** has become special assistant overseer. * * * At the Proximity plant, **Frank Clark** has assumed the position of overseer of weaving. * * * **C. Porter Cook** has been named overseer of weaving on the first shift at the Pineville plant. **James M. Bridges** has been promoted to overseer of weaving on the second and third shifts. **Samuel S. Crump** has become assistant overseer of third shift weaving, and **Robert W. Ott** has been named assistant over-

Dr. Wham
Phillips-Van Heusen

John Caughman
Spartan Mills

Dr. Lotz
Hess, Goldsmith

Mr. Corkum
American Thread

Mr. Cruickshank
Bradford Dyeing

Mr. Stott
Bradford Dyeing

Mr. Barbre
Karageusian

Mr. Lauman
Karageusian

...new EASTMAN breakthrough

SOLUTION-DYED BLACK KODEL POLYESTER

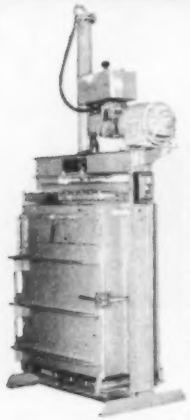
Now you can get a polyester fiber in a true colorfast black! Kodel, the champion of stay-fresh fibers, is first in America with this important new fiber development. A breakthrough that means new styling possibilities for polyester blends... more dimension, more colors, more pattern effects. Complete color uniformity in your blacks, too. Eastman's new Kodel black is now being produced in 2.25, 3 and 4 denier-per-filament staple ... also tow. Look into it today!

EASTMAN KODEL® POLYESTER FIBER

Kodel is the trademark for Eastman polyester fiber

EASTMAN CHEMICAL PRODUCTS, INC., SUBSIDIARY OF EASTMAN KODAK COMPANY, 260 MADISON AVENUE, NEW YORK 16

All-Steel Hydraulic
BALING PRESSES
FOR EVERY NEED



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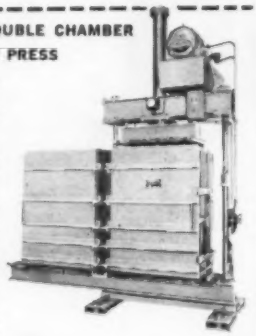
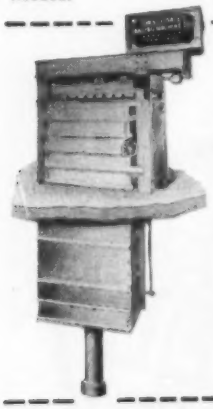
High-speed, easy operating press, completely self-contained; dense, compact bales, 50-500 lbs., from 4 standard models, more from custom sizes. Lowest initial, operating and maintenance costs.

TYPE DHB DOUBLE CHAMBER
DOWNSTROKE PRESS

Continuous high-speed, high-production, high-density baling; maximum efficiency and economy; 9 standard sizes. Simultaneous loading and pressing with revolving chambers; extra safety features, simple operation, no special pit or foundation needed.





TYPE HUS
UPSTROKE PRESS

Truly heavy-duty service with greatest economy, maximum production of dense, heavy bales. Outstanding construction features, extra safety devices, versatile loading (from working floor, floor above or both).

Over 50 standard types and models of hydraulic baling presses

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Hydraulic specialists since 1909
CONSOLIDATED
BALING MACHINE COMPANY
197 Sixth Street, Brooklyn 15, New York

PERSONAL NOTES

(from page 196)

seer of the cloth room on the second shift. * * * **Arthur Rollins** has assumed duties as general overseer of carding and spinning at the Revolution plant. **Obert Hammer,** formerly assistant, has been appointed overseer of carding.

Frank Urtz, formerly production control manager, has been named assistant treasurer of Oneita Knitting Mills, Andrews, S. C.

Donald C. Johnston, general manager of the northern group of the woolen and worsted division of J. P. Stevens & Co., Inc., has been named assistant executive officer of the division. **John F. Matthews** has been named to succeed Mr. Johnston. **Maurice Phillips** has been appointed assistant general manager of the division. In his new position, Mr. Johnston will have headquarters in the Milledgeville, Ga., office.

James C. Self, president of Greenwood (S. C.) Mills, has been named a life trustee of Clemson (S. C.) College.

H. E. Buchanan and **Pete R. Gilbert** have been promoted to foremen of knitting for the Weeks division of Hanes Hosiery Mills Co. **Charles D. Livengood** has been appointed foreman of looping; **Richard E. Gardner** has become foreman of third shift pre-boarding; **William Flinchum** has been named foreman for pairing. **J. Raeford Tuttle** has been appointed foreman for finishing, and **Charles E. Bean, Jr.,** has become foreman for packing.

Julius Stern, formerly president and treasurer, and **Gerry A. Lebach,** formerly production manager and purchasing agent, have resigned their positions with Marum Knitting Mills, Inc., Lawrence, Mass.

B. F. Byrd has been named general overseer of weaving for Fulton Cotton Mills, Atlanta, Ga. **Adrain C. Smith** has assumed the duties of foreman in the spinning department. * * * **George F. Watson** has been promoted to superintendent of the cotton mills.

Stanley S. Rosner, formerly vice-president of United Piece Dye Works, has accepted the position of management consultant for Cliffside (N. J.) Dyeing Corp.

Lewis Almond, Sr., research and testing supervisor of the Porterdale (Ga.) mills of Bibb Manufacturing Co., has retired.

Alfred Flaxington has been promoted to plant superintendent of the Pawtucket, R. I., mill of Coats & Clark, Inc.

M. Weldon Rogers has opened a textile consulting service at 3516 Woodhaven Rd., N. W., Atlanta, Ga.

W. T. Mundy, Jr., has assumed duties as chief methods and standards engineer for the Ware Shoals division of Riegel Textile Corp. * * * **Samuel H. Orr,** formerly chief in-

TOP ROW (l to r)
Mr. Bean
Mr. Buchanan
Mr. Flinchum

BOTTOM ROW
Mr. Livengood
Mr. Tuttle
Mr. Gilbert
Mr. Gardner

FREE MAIL ANALYSIS

P-K Textile
Heat Reclaimers

RECOVER 25-50% WASTE HEAT

A simple economy takes place with P-K Textile Heat Reclaimers. Waste hot water pre-heats incoming cold water. This recovers 25-50% waste heat. It reduces fuel costs. It increases boiler capacity. Savings run $8,000 a year and more. Installations pay for themselves completely in as little as nine months!

P-K Textile Heat Reclaimers are custom fitted to the needs of each mill. Single unit construction saves valuable floor space. Quick opening doors simplify inspection, minimize downtime. A patented P-K Roto-Screen traps lint, scum and other fouling agents. Point by point they reflect the unmatched experience, care and responsibility of the largest and oldest manufacturer in the field.

FREE MAIL ANALYSIS. We'd be pleased to estimate the advantages of a P-K Reclaimer for your own mill. Our special mail analysis form makes it easy. You simply outline your conditions to us. We send our estimates to you by return mail. Too, we'd be glad to discuss the advantages of complete modernization from steam injection to a continuous hot water system. No obligation. Just return the coupon.

TYPICAL CASE HISTORIES:

At Stanley, N. C., the Textile Division of Talon, Inc. obtained a needed increase in hot water capacity, improved product quality and saved $1,000 a month in fuel costs with a P-K Reclaimer and a 7,000 gal. P-K accumulator tank.

At Bangor, Pa., the Blue Ridge Textile Co. saved $8,000 a year on fuel costs. P-K Reclaimer located outside dye house paid for itself in nine months.

20

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Laundry and Textile Division

P-K Steam Mixers • P-K Boiler Return Systems • P-K Heat Exchangers •
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PATTERSON KELLEY CO., INC.
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Please send your special mail analysis form and literature on P-K Textile Heat Reclaimers.

We use steam injection for heating water No ☐ Yes ☐

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Company_____

Street_____

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At the recent annual convention of the Southern Textile Association held at Asheville, N. C., **W. B. Etters** (left), Reeves Brothers, Inc., was elected first vice-president; **Robert M. McCrary**, Hart Cotton Mills, president; **Joe N. Jenkins**, The Kendall Co., chairman of the board.

New S.T.A. board members are: (l to r) **Louis Burkes**, Calhoun Mills; **Smith Crow, Jr.**, Leward Cotton Mills; **Troy Carter**, Woodside Mills; **Nelson Kessel**, P. H. Hanes Knitting Co.

dustrial engineer of the Ware Shoals division, has been named to that position at the Trion division. * * * **B. P. Robinson**, former director of industrial relations, has accepted the position of executive director of the Newberry (S. C.) County development board. * * * **M. B. Eubanks, Jr.**, director of purchasing and transportation, has been elected National chairman of the committee on public relations for the National Association of Purchasing Agents.

Ray L. Swetenburg, vice-president of Chicopee Manufacturing Corp., Gainesville, Ga., has been named chairman of the board of directors of the Georgia-Alabama Textile Traffic Association.

Thomas A. Huff, formerly in charge of manufacturing for Harding Carpet, Ltd., Brantford, Ontario, Canada, has been elected a vice-president of Hightstown (N. J.) Rug Co. Mr. Huff is in charge of all production. * * * In a realignment of the sales division, **Raymond J. O'Neill** has assumed the position of styling and products manager.

Don Shaw, Jr., has resigned as plant manager of Excelsior Mills, Inc., to accept the position of vice-president of Milliken Woolens. **C. E. Anderson** has been named to succeed Mr. Shaw.

OBITUARIES

Benjamin A. Alford, 56, general manager of the Sanforized domestic operations for Cluett, Peabody & Co., Waterford, N. Y.

Joseph A. Amato, 50, vice-president in charge of the factoring division of James Talcott, Inc., New York, N. Y.

Frederick R. Crowell, 70, president of Delaware River Jute Mills, Inc., Philadelphia, Pa.

Walter H. Glenn, 54, retired manager of Glendale Mills, Spartanburg, S. C.

R. C. Heyward, 82, retired superintendent of the Rockingham (N. C.) Mills, Inc.

Clarence J. Hyslup, 60, safety and training director of Chatham Manufacturing Co., Elkin, N. C.

George D. McCaughey, 58, knitting department instructor at Philadelphia Textile Institute, Philadelphia, Pa.

Glen Miller, industrial foreman of textiles at Sing Sing Prison.

Francis R. Reynolds, 46, president of Reynolds Knitting Mills, Inc., Norristown, Pa.

Ross C. Rodgers, 58, president of Scholler Brothers, Ltd., St. Catharines, Ontario, Canada.

Leon W. Sidebottom, 70, retired chemist for BB Chemical Co., Franklin, Mass.

Aaron S. Staff, 70, founder and president of Texagon Mills, Ridgefield, N. J.

James Stafford, 64, general manager of the former Jamestown (N. Y.) Worsted Mills.

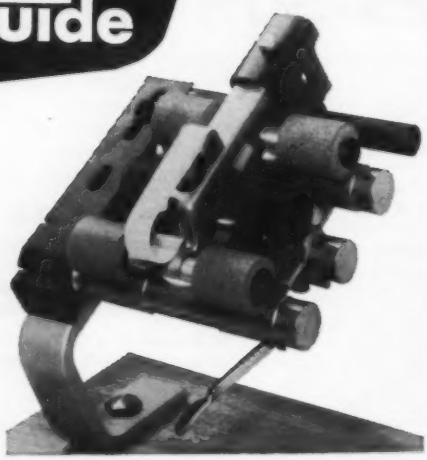
R. K. Webb, 73, retired personnel director of Fairforest Division of Eagle and Phenix Mills, Reeves Bros., Inc., Columbus, Ga.

CleanGuide

PATENTS PENDING

SPINNING

CHANGEOVER



- Improves Yarn Quality Through Better Apron Control
- Non-Oiling — Antifriction Top Roll
- Operates Clean — Easy to Install or Remove
- Converts Practically All Types of Spinning to Double Apron Drafting

100,000 Spindles installed or in Process—See and Prove it for Yourself

COTTON-McCAULEY & CO., INC.

PAWTUCKET, R. I. GREENVILLE, S. C. CHARLOTTE, N. C. ATLANTA, GA.

MANUFACTURED BY MACHINECRAFT, INC., WHITMAN, MASS.

Available through Saco-Lowell Shops and their agents

MILL NOTES

The first "constant-flow" mill for processing jute rug backing from fiber to fabric will be established in Jamaica, West Indies, by the **Ludlow Corp.** The plant facility will occupy more than 150,000 sq ft on a site of approximately 40 acres. Initially it will employ 500 local people. The enterprise will be operated as a wholly-owned subsidiary of Ludlow, to be known as **Textile Manufacturers, Ltd.**

James Lees and Sons recently held an open house at the Glasgow, Va., carpet plant marking the 25th anniversary of its operation. A highlight of the program was the presentation of gold watches to twelve employees who have been with the company from the time the operations started.

Southern Mills, Inc., Senoia, Ga., has announced plans to expand present facilities by 38,000 sq ft and to increase employment by 50.

Newnan (Ga.) Mills, Inc., is manufacturing cotton fabrics in one unit of the former Newnan Cotton Mills plant and has employed between 50 and 60 persons.

A $500 yearly University of Georgia scholarship, to become first available for the fall '60 term, has been offered by **Coats & Clark, Inc.,** to employees and children of employees of the firm's Georgia mills.

General Knitting Mills, Monroe, N. C., has purchased land adjacent to the home office and plant to expand the storage area and knitting facilities.

Schlegel Manufacturing Co. has announced plans to build a new plant and distribution center in Chester, S. C. The company will manufacture a variety of narrow loom industrial textiles, and will employ about 50 persons. Frank R. Rochow of the Rochester, N. Y., plant will be manager.

A charter of incorporation has been issued to the **Caswell Seamless Hosiery Mills, Inc.** The corporation succeeds and takes over the partnership business formerly operated as Caswell Seamless Hosiery Mill, Yanceyville, N. C.

A 25,000 sq ft addition is under construction at the Liberty (S. C.) Mill No. 2 of **Woodside Mills, Inc.** It is estimated that the $1,500,000 expansion, which will include machinery additions, will provide 25 to 30 additional jobs. * * * The Haynesworth plant in Anderson, S. C., has increased production twenty-five per cent and has added approximately 50 employees. * * * An increase in production and employees has been instituted at the Norris Cotton Mills Co., Cateechee, S. C.

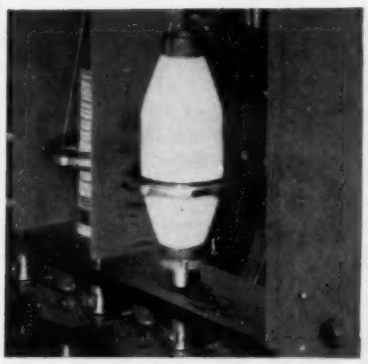
A new seamless hosiery plant is being constructed in Morristown, Tenn., by **Medlin Hosiery Mills, Inc.** The plant is adjacent to the present mill and will employ about 50 persons. Wayne Needham is superintendent and B. B. Bradley has been named general manager.

Zwicker Knitting Mills, Appleton, Wis., has announced plans to construct a research and development

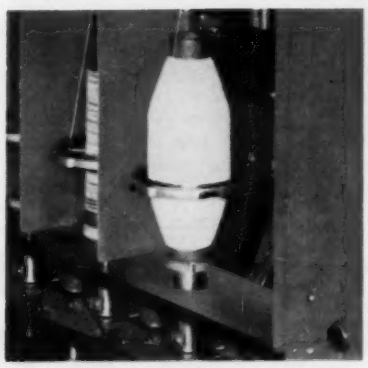
WHITE

NON-FLUID OIL

TRADE MARK REGISTERED



Ordinary ring oils blacken yarn, cause loss of production



White NON-FLUID OIL stays on rings increases output per frame

White NON-FLUID OIL does not spread out on rails to spatter bobbins. It stays on rings and lubricates effectively. This eliminates blackened yarn, reduces broken ends to a minimum; or more simply, it increases your output per frame.

White NON-FLUID OIL adheres to wearing surfaces. Its exceptionally high lubricating properties and tenacious nature keep travelers running almost friction-free. This reduces the pull at high speeds, resulting in fewer broken ends, and a yarn of a more uniform quality.

White NON-FLUID OIL is neutral; it does not become gummy; therefore, it lasts longer on wearing surfaces than petrolatum, liquid oil or ordinary ring greases. And you effect still another saving! Fewer applications and less lubricant are needed.

Send for free testing sample of White NON-FLUID OIL and Bulletin T-16. You'll be amazed at the difference.

See our Booth #109 at 21st Southern Textile Exposition — October 3rd-7th.

NEW YORK & NEW JERSEY LUBRICANT CO.

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WORKS: NEWARK, N. J.

Sou. Dist. Mgr.: Fred W. Phillips, Greenville, S. C.

WAREHOUSES:

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Greensboro, N. C.	Greenville, S. C.		Providence, R. I.
Springfield, Mass.	Chicago, Ill.	Detroit, Mich.	St. Louis, Mo.

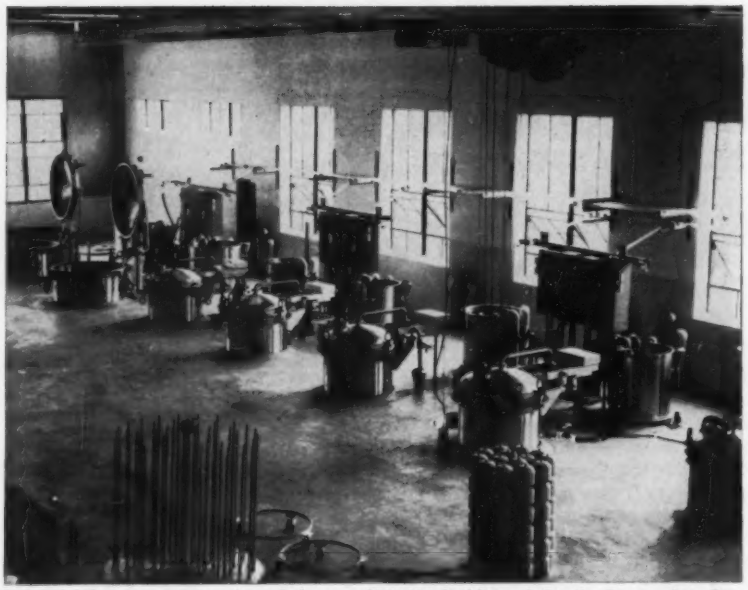
NON-FLUID OIL is not the name of a general class of lubricants, but is a specific product of our manufacture. So-called grease imitations of NON-FLUID OIL often prove dangerous and costly to use.

MILL NOTES

(from page 201)

wing to the existing plant. The addition became necessary because of the decision to proceed with immediate expansion of the fashion design department.

Wunda Weve Carpet Co., Greenville, S. C., has announced a $1,488,000 expansion program which will include three additions to the present plant and production facilities. The first of the three additions, containing 6,000 sq ft of floor space and which houses a specially designed boiler and supplementary steam producing equipment for custom dyeing and for handling carpet finishing processes, has been completed. The second addition will be an extension to the front of the main weave room and will contain 40,000 sq ft of floor space to be utilized for office space for accounting, sales, service, and production personnel. The third addition will increase the manufacturing space by 30,000 sq ft. New tufting and knitting equipment and two new 15 ft weaving looms have been installed.



Pictured left is an exterior view of the new $750,000 building of **Corlin Processing Co.,** Landis, N. C. A joint venture of Linn Mills and Corriher Mills Companies, the facility is said to be one of the most modern package dyeing plants in the world. Shown above is the main floor of the dyeing room. Left to right are two 750-lb kiers, four 300-lb kiers, and one of the two 200-lb kiers. The great flexibility of machinery arrangement permits production of dye lots ranging from 200 to 1500 pounds of yarn in a single dye bath.

William G. Leininger Knitting Co. has initiated a $100,000 renovation and expansion program at the Wilton, Pa., plant. Completion is expected in mid-September.

Ming Toy Dyeing Co., Inc., Haledon, N. J., has ceased operations. Plans for the disposition of the plant or equipment have not been announced.

Foremost Screen Print, Inc., has moved its operations from the Jersey City location into the recently leased 40,000 sq ft quarters in the Bergen County Industrial Terminal, Garfield, N. J.

Fifty-eight employees of the Pell City plant of **Avondales Mills** have been presented certificates of merit, suitable for framing, for having completed one year's perfect attendance at work.

The new plant of **P. H. Hanes Knitting Co.,** now under construction

EUROPEAN

YARNS

combining excellent working qualities for creating distinctive functional beauty

CARDED AND COMBED COTTON

American-type Egyptian Karnak-Sudan • Peru

SINGLES AND PLIED • MERCERIZED • GASSED • BLEACHED • DYED NATURAL

ON ANY "PUT-UP"

Artificial and synthetic yarns, carded wool yarns, novelty yarns

MIXED BLENDS OF WOOL & COTTON SYNTHETICS, SPUN RILSAN & STAPLES

Write for working samples; technical services also available

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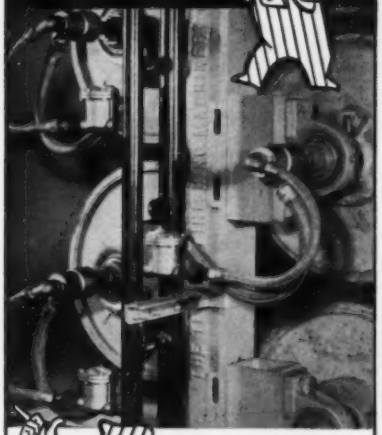
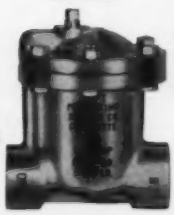
HAE-LSE/260 ALL ACCOUNTS U. S. FACTORED

How to Keep Your Dry Cans Happy



UNITRAP*



The PSC Unitrap and Rotary Union feed your dry cans with a steady flow of steam and eliminate over or under dried warps and cloth.

THE UNITRAP MODEL 70T Large Capacity and trigger action condensate discharge assure an uninterrupted flow of hot dry steam. Stainless steel working parts give extra-long and trouble-free service. This Unitrap has a universal pressure range from 0 to 125 lbs.

THE ROTARY UNION automatically adjusts to pressure changes and to misalignment of adaptors, and maintains a positive seal at all times without mechanical maintenance. Exclusive syphon construction assures maximum removal of condensate from cylinders.

Write for Bulletins 700 and 800.

*Trade Name — Patented

"WHERE *Good Connections* COUNT"®

PERFECTING SERVICE CO.

332 Atando Ave. Charlotte, N. C.

Baltimore · Buffalo · Chicago · Cleveland · Camden · Los Angeles · New York · Providence · Montreal · Toronto

in East Galax, Va., is to be increased in size by 32,000 sq ft. The change in size of the building was made to afford more head room in the shipping department and stock rooms.

Waumbec Mills, Manchester, New Hampshire, will have all looms equipped with filling winders by September. The installation, costing over $500,000, is part of an estimated $1,000,000 capital expenditure in 1959 and 1960 for up-to-date equipment.

The Carolina Sports Knitting Co., Florence, S. C., has installed 26 new knitting machines and is producing 20,000 pairs of nylon dress socks a week for the U. S. Army.

Supervisory and management personnel of **Fulton Cotton Mills,** Atlanta, Ga., recently attended a series of discussions on management development. Patrick B. Comer, a management consultant and industrial psychologist, and Clarence Elsas, president of the company, led the discussions. **Fulton Cotton Mills, Inc.,** has changed the corporate name to **Fulton Industries, Inc.** The textile operations will continue as a separate division under its current name, Fulton Cotton Mills.

Seamless hosiery is being produced at the Wadesboro, N. C., plant of **Burlington Industries, Inc.** A declining demand for full-fashioned hosiery was given as the reason for the changeover.

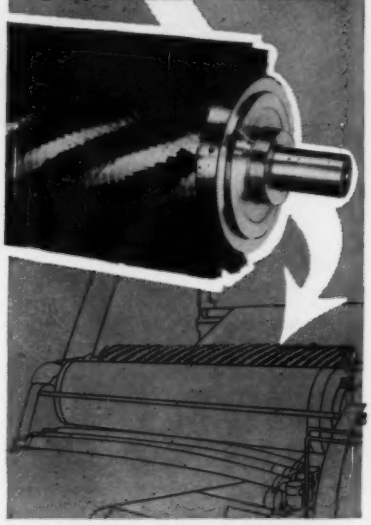
The facilities of **Bothwell Mills, Inc.,** Newton, N. C., have been doubled. New machines have been installed and employment has been increased.

Valchem, a division of **United Merchants & Manufacturers, Inc.,** has announced plans for a 10,000 sq ft addition to the present plant at Langley, S. C.

Employees of the **Binghampton (N. Y.) Knitting Co., Inc.,** were recently presented the ten-year safety plaque by Associated Industries of New York, Inc., for having completed ten successive years with no lost-time accidents.

A new nylon processing firm, **R. J. Kunik & Co., Inc.,** has been formed in Philadelphia, Pa., by R. J. Kunik, formerly vice-president and secretary of Hepworth-Kunik and Co., Inc., of Conshohocken, Pa.

WHY JENKINS' METLKOR® BRUSHES are on JAMES HUNTER SQUEEZE ROLLS



A JAMES HUNTER SQUEEZE ROLL WITH JENKINS' METLKOR BRUSH

James Hunter Machine Co., North Adams, Mass., wanted a brush to stand up when removing acidified flock from their Carbonizer Squeeze Rolls. Jenkins' engineers designed a METLKOR brush with exposed metal parts of stainless steel and bristle of acid-resistant Nylon.

Mr. Frank B. Morrill, Chief Engineer, James Hunter Machine Co., says: ". . . we have been using Jenkins' brushes for flock removal on our Squeeze Rolls for years . . . they do a much better cleaning job than the brush previously used, and stand up several times longer . . ."

This top textile machinery manufacturer has proven the efficiency of Jenkins' METLKOR — the cylinder brush that lasts many times longer and can be re-bristled! If you have any standard or special brush problem, write us today.

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Waste Disposal
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Pulp & Paper Mills
Surveys & Reports

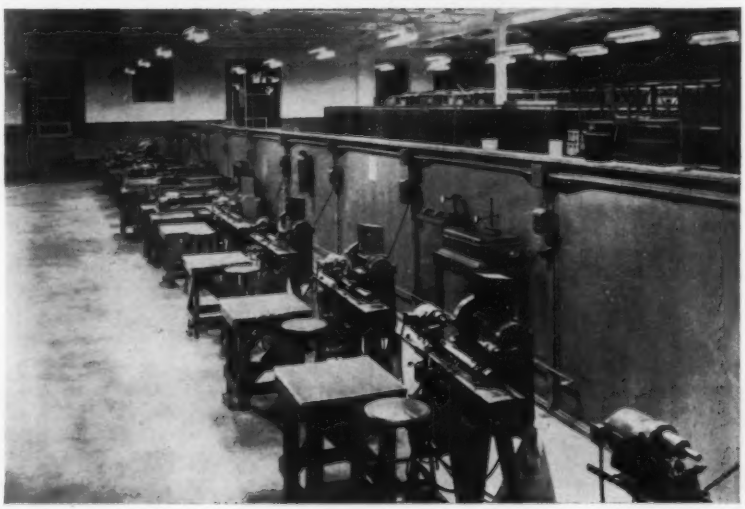
GREENVILLE,
SOUTH CAROLINA

SUPPLIER NOTES

Wm. J. Moore has been appointed as a special representative to the southern textile mills for the textile division of **The Creamery Package Mfg. Co.** Mr. Moore will represent the company for positive stainless steel slasher pumps—rotary type, CP stainless steel heat exchangers for starch cooling, homogenizers for sizing, and the complete range of CP refrigeration equipment including CP compressors and boosters.

The **Charlotte Chemical Labora-**

The new combination plant and sales office of **Armstrong Cork Co.**, located in Pleasantburg Industrial Park, Greenville, S. C., covers 18,000 sq ft of floor space and includes greatly expanded warehousing and shipping areas. Below, an interior view of the roll shop which is designed to buff and recover almost any type of roll.



tories, Inc., has announced the purchase of **Indianapolis Chemical Co.** Products of the latter firm will be manufactured and shipped from the parent firm in Charlotte, N. C.

C. Wells Moore, Jr., president and owner of Moore Textiles, has accepted a position in a sales advisory capacity with **Southern Latex Corp.**

J. O. Ross Engineering, a division of Midland-Ross Corp., has installed special testing equipment in their laboratory in New Brunswick, N. J. The equipment includes a Waldron multi-coater, capable of performing all methods of applying coating to a material (such as reverse roll, blade, microjet, squeeze, knife, and levelon), an unwind unit, and a rewind unit. The firm has also installed an "RD" straight-pass or multi-pass type high velocity dryer, and an "SP" sectionalized type high velocity dryer over a standard steam heated dryer roll.

A new pilot plant facility to speed development of modified starch products for the paper, textile, and other industries, has been put in operation by the **A. E. Staley Mfg. Co.**

Carbic-Hoechst Corp., Hostachem Corp., Hostawax Co., subsidiaries, and the accounting department of Intercontinental Chemical Corp. have moved into the new headquarters at 270 Sheffield St., Mountainside, N. J. Executive offices of Intercontinental Chemical and Hoechst Pharmaceuticals will remain at the present location, 350 Fifth Ave., New York, N. Y.

All sales activities of **The Cleveland Crane & Engineering Co.** have been consolidated into one sales department under Robert G. Birkin as general sales manager, and J. G. Frischkorn, sales manager. The new department will be responsible for the sale of heavy overhead traveling cranes, overhead materials handling equipment, metal-cutting shears, press brakes, and straight side and speed-draw presses.

H. J. Anderson & Co., Toronto, Ontario, Canada, has been appointed by **Birch Brothers, Inc.,** as exclusive representatives in Canada.

Union Special Machine Co. has completed the move into the newly constructed building at 2120 Plasters Bridge Rd., N. E., Atlanta, Ga.

Putnam Chemical Corp. has announced the appointment of G. A. Wolff as manager for polymer sales.

Mr. Estes
Clinton Corn

Mr. Kair
Clinton Corn

Mr. Cline
Clinton Corn

Mr. Rau
Clinton Corn

Fletcher Southern has begun the production of all Fletcher throwing machinery.

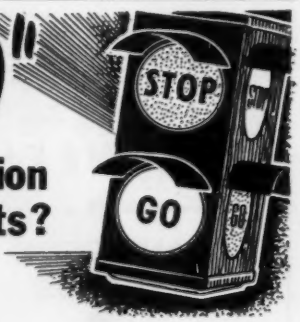
R. C. Rau has been appointed to the position of sales manager of primary products for **Clinton Corn Processing Co.,** with headquarters in Clinton, Iowa. C. F. Cline, Jr., has been named to succeed Mr. Rau as southern division general sales manager and will be located in the new southern division headquarters in Greenville, S. C. Russell L. Kair has been appointed district manager of the Atlanta district covering the states of Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, and Tennessee with headquarters in Atlanta, Ga. Boyce L. Estes has been named district manager of textile sales, covering the states of Georgia, Alabama, Mississippi, and Tennessee with headquarters in Atlanta.

William G. Sumner has been promoted to the position of sales engineer at the Chattanooga, Tenn., branch office of the dyestuff and chemical division of **General Aniline & Film Corp.** In his new position, Mr. Sumner will be concerned with the application of the firm's chemicals in the textile, paper, and leather industries in that territory.

Geigy Dyestuffs, a division of Geigy Chemical Corp., has moved its Chicago branch office to a new building at 5677 North Northwest Highway.

The textile fibers sales and merchandising group of **The Dow Chem-**

IS "STOP and GO" Production Robbing You of Profits?



"Stop-and-go" production of cloth is costly . . . and unnecessary when the stoppages are due to the fabric guiders. No two fabrics can be handled exactly alike. But you can eliminate a lot of time and expense by installing

MECHO AIR GUIDERS

. With Mecho on the job, you can quickly adjust for the lightest fabric or #8 duck *while in operation.* . Once set, it will maintain constant cloth alignment and guide within 1/8 inch. It can't spatter or turn a double edge . . . and there are no weights or levers to fuss with. No repair problem, either.

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- Wide smooth fingers prevent cutting of bobbin inner edges
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SPOOLS AND BOBBINS

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— To Save You Money.

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LAWRENCE, MASS., U.S.A.
SERVING NEW ENGLAND SINCE 1917

SUPPLIER NOTES

(from page 205)

ical Co. has moved into new and expanded quarters on the eighth floor (room 801) of 350 Fifth Ave., New York, N. Y. Featured in the new quarters is a working showroom for members of the trade—cutters, converters, and retailers. The showroom will display up-to-date fabric and cutter lines using Dow fibers and will contain an extensive fabric library for developmental work.

Stanley C. Prater has been promoted to advertising manager for the chemical division of **Minnesota Mining and Mfg. Co.**

The newly completed 40,000 sq ft research center of **The Warner & Swasey Co.** is now fully staffed and in operation at Solon, Ohio. Textile engineering facilities, centered around a special humidity and temperature controlled machine test laboratory which can simulate most any desired set of textile mill operating conditions, have been provided.

Thomas E. Stribling, Jr., has been appointed director of research for **Werner Textile Consultants.** Mr.

Stribling succeeds the late Stephen I. Rudo.

Courtaulds Plastics Canada, Ltd., a wholly-owned subsidiary of Courtaulds (Canada), Ltd., has been appointed as the distributor in Canada of AviSun polypropylene polymer, film, and fiber.

Proctor & Schwartz, Inc., has announced the transfer of the branch service and reclothing shop facilities located in Spartanburg, S. C., to its new modern production plant in Lexington, N. C.

Edward C. Kells has been appointed manager of the New York metropolitan industrial sales for **Corn Products Sales Co.**

The Felters Company has purchased the Millbury, Mass., plant of **Watson-Williams Mfg. Co.,** in an expansion move to provide warehouse space and improve service to customers.

The **Supreme Knitting Machine Co.** has appointed Monroe Machinery Sales Co., Monroe, N. C., as southern sales and service representatives for Supreme's complete line of circular jersey, rib, terry, interlock, and special knitting machinery.

Thomas L. Carver, formerly eastern regional sales manager, has been appointed to the newly created position of staff manager for weaver sales for **Johns-Manville Sales Co.** Mr. Carver's new duties include product responsibility for glass yarns and rovings for the weaving industry, and management of sales planning and merchandising policy.

Thomas J. McGann, vice-president of **James Talcott, Inc.,** has been named to head the factoring division and has been appointed to the executive committee.

A realignment of the eastern and mid-west regional sales territories has been made by the chemicals division of **Eastman Chemical Products,**

PORTABLE MOISTURE MONITOR

New Model M-200 Moisture Monitor uses hand detector roll to read moisture in moving or standing warps, fabrics, and picker laps.
No calibration is required; the new instrument reads in PERCENT REGAIN for all popular fibers and blends.

STRANDBERG
ENGINEERING LABORATORIES, INC.
Dept. T-606 225 Summit Avenue
Greensboro, North Carolina

Inc. The eastern regional territory will now include the east and southeast states. The mid-west region will cover the middle west and north central states. R. Clary Dubberly has been placed in charge of the Cleveland office, serving northern Ohio. George O. Trabue, formerly in the Cleveland office, will supervise the new sales office soon to be opened in Buffalo, which will include western New York, western Pennsylvania, and southern Ontario. Kenneth E. Cox, formerly sales representative in the St. Louis office, has been appointed district sales manager in the Skokie office. H. Lynn Francisco, a sales representative, has been transferred from the Skokie office to take charge of the St. Louis office. Robert M. Morrow has been transferred to the new office in Kansas City. John H. Sanders has been named sales manager of the division.

The new plant of **The Torrington Co.,** located in Walhalla, S. C., is now in operation. The unit will specialize in fine-gauge latch knitting machine needles used in the manufacture of seamless hosiery.

Willcox & Gibbs Sewing Machine Co. has been appointed sole distributor in the U. S. for **F. Strobel and Son,** manufacturers of blind stitch sewing machines in Europe.

Mr. Grant
Franklin Process

Mr. Spencer
Sandoz

Mr. Emerson
Sandoz

Mr. Lancaster
Sandoz

Douglas Grant has joined the New York City sales force of **Franklin Process Co.,** a division of Indian Head Mills, Inc.

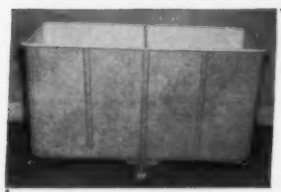
Fred Kutch has been named sales manager for petroleum and industrial products of the liquid meter division of **Neptune Meter Co.**

Alfred W. Spencer has been named supervisor of chemical sales for the Charlotte, N. C., office of **Sandoz, Inc.** Edward J. Lancaster, Jr., has been appointed manager of the newly created sales district comprising most of South Carolina, Georgia, Alabama, and eastern Tennessee. Mr. Lancaster will be headquartered in Charlotte, N. C. Jack H. Emerson has been named a sales representative for the dyestuff and chemical divisions.

A. E. Johnston, Jr., plant manager at Greenville, S. C., has been appointed southern sales manager for the cotton division of **Ashworth Bros., Inc.** Mr. Johnston will have full charge of sales of cotton card clothing.

Tubular Textile Machinery Corp. has purchased all of the assets of **Redman Process American Corp.**

George A. Schreiner, manager of technical service of the Sanforized



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DRONSFIELDS' PATENT

ATLAS BRAND

EMERY FILLET

STOCKED BY
THE PRINCIPAL MILL SUPPLY HOUSES AND CARD MAKERS

SUPPLIER NOTES

(from page 231)

division of **Cluett, Peabody & Co., Inc.,** has retired.

American-Marietta Co. has purchased **Consolidated Engravers, Inc.** The latter firm will be operated as a division of American-Marietta, and John F. Ladley will continue as operating head of the division.

New developments in the application of electronic counters will be the subject of a **Veeder-Root, Inc.,** technical assistance program. First phase of the program will be a training symposium for electronic counter specialists. This will be followed by a schedule of "desk-top demonstrations" to assist industry in the proper application of electronic counters and actuation devices, particularly where increased counting speed, accuracy, and flexibility are required.

The fibers division of **American Cyanamid Co.** has opened a west coast sales and merchandising office for the firm's new Creslan acrylic fiber. The new operation is located in the Los Angeles sales office and is headed by Ben W. Wiesen, recently named manager of the west coast sales and merchandising for the division.

Mr. Fleming
Melion Corp.

Mr. Cobb
Terrell Machine

Robert H. Fleming has been appointed southern representative by **Melion Corp.** for the states of Tennessee, Georgia, Alabama, and Florida.

The **Curtis & Marble Machine Co.** has announced acquisition of the **J. E. Windle Machine Works.** The machinery and equipment of the latter firm will be transferred to the Worcester, Mass., plant of the parent firm.

The **Draper Corp.** has announced the appointment of Earl Killion to the northern sales office, and Robert A. Potter to the position of repair parts representative.

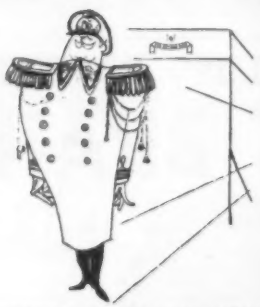
Joe C. Cobb, sales manager of Benray, Inc., has joined the sales staff of the **Terrell Machine Co., Inc.** Mr. Cobb will contact southern mills concerning Terrell and Schlafhorst equipment and supplies. Prior to joining Terrell, Mr. Cobb was associated with Reeves Brothers, Inc., and Pacific Mills.

C. C. Kaesemeyer has been appointed executive vice-president of sales for **Fuller Co.,** a subsidiary of General American Transportation Corp. Donald S. Douglass has been named vice-president, division sales coordination; and Jack L. Prather has become assistant to the president.

Jack H. deKruif, formerly of Hughes Aircraft Co., has been appointed vice-president of marketing and sales for **Warner Electric Brake & Clutch Co.**

Karl Klomparens, formerly technical director, has been promoted to industrial sales manager of **Diamond Crystal Salt Co.**

Leslie L. Walmsley has been pro-



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Man now presently employed on American system of spinning with supervisory experience desiring to make a change — excellent opportunity available — location in south— give full details — appointment will be arranged and expenses paid for interview — replies will be kept in confidence. If available send latest resume to —

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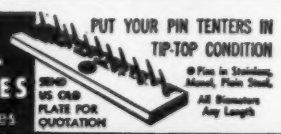

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West Point, Georgia

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moted to the newly created position of converting relations technical advisor for the technical service department of **American Viscose Corp.** Irving H. Welch has been named to head of the dyeing and finishing division.

The Fletcher Works recently donated a new high speed 9000 rpm Duplex doubler twister to the Philadelphia Textile Institute, to be used for instructional and research purposes.

Francis R. Landau has been named vice-president of **Business Factors Corp.**

Medley Manufacturing Co., Inc., has announced the sale of 52 deliveries of SACM drawing frames to be installed in October at the Chiquola plant of M. Lowenstein & Sons, Inc., Honea Path, S. C.

The Dayton Rubber Co. has changed its name to **The Dayco Corp.** * * * Production of rubber and synthetic-covered rollers used in the textile and other fields has been established by Dayton Industrial Products Co., a division of Dayco, at the Waynesville, N. C., plant.

Anderson, Clayton & Co. has announced the appointment of William W. Deupree as manager for the central and southeastern territory with headquarters in Memphis, Tenn. Mr. Deupree succeeds M. A. Woolen, who has resigned.

John C. Fenley, secretary and sales manager of the **Paramount Textile Machinery Co.,** has resigned his position to enter the real estate business.

An additional 68,400 sq ft of factory space has been added to the Lexington, Ky. plant of the **Square D Company.**

The parts department, receiving department, and a large portion of manufacturing operations of **Supreme Knitting Machine Co.** has been moved from the Brooklyn, N. Y. plant to the main plant at Ozone Park, N. Y.

Allied Chemical Corp. has announced plans to construct a new fine-denier Caprolan nylon yarn plant at Irmo, S. C. The multimillion dollar plant is expected to be completed in late 1961 and will increase the company's overall nylon capacity to more than 80 million pounds per year.

A new building is being erected in Kingsport, Tenn., for the sales service and product development laboratories of the chemicals division of **Eastman Chemical Products, Inc.,** a subsidiary of Eastman Kodak Co. The new facility will contain 60,000 sq ft of floor space.

American Viscose Corp. has opened the first southeastern district sales office for its new industrial packaging department in Charlotte, N. C. Alfred M. Lynch has been named district manager.

Kenneth Burdon has been named southern New England district sales manager for **New York & New Jersey Lubricant Co., Inc.** Mr. Burdon succeeds Harry H. Beaman, who has retired.

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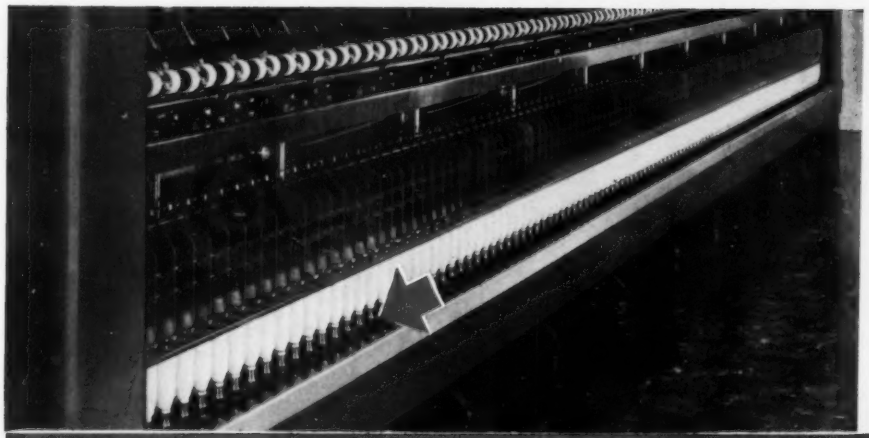

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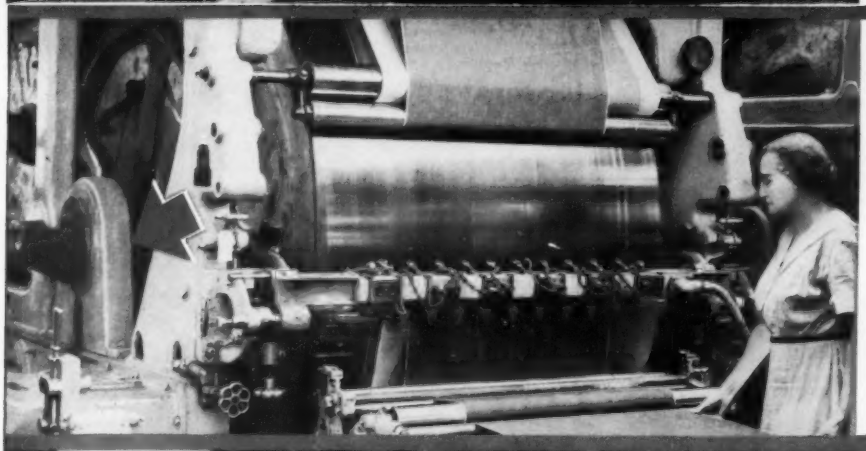

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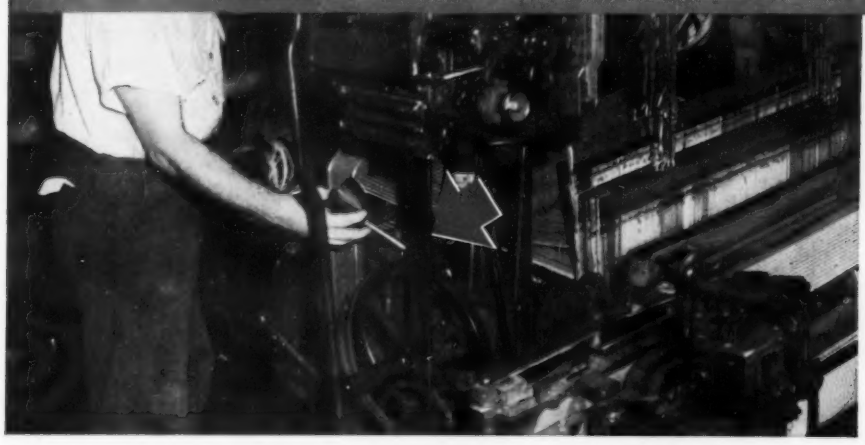

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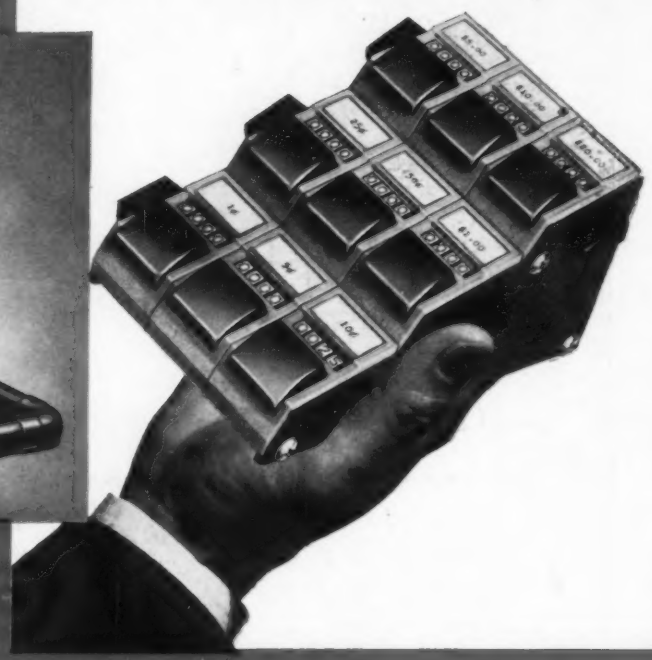

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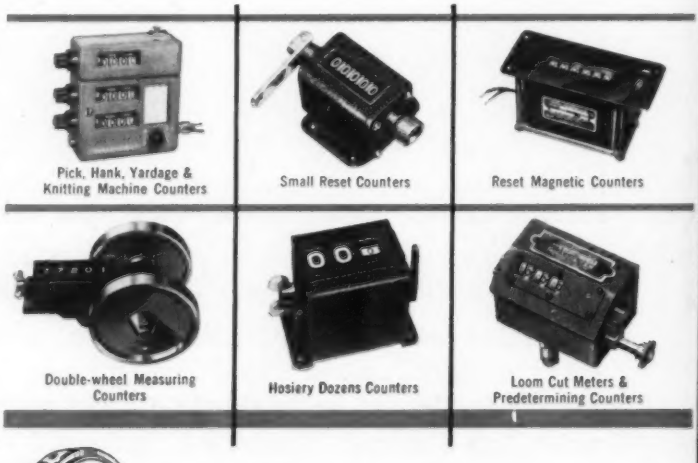
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